No 2863 VOLUME 77 FRIDAY 25 MARCH 1960

FLIGHT

AIRCRAFT, SPACECRAFT, MISSILES

Official Organ of the Royal Aero Club First Aeronautical Weekly in the World Founded 1909

Editor-in-Chief
MAURICE A. SMITH DFC

Editor
H. F. KING MBE

Technical Editor
W. T. GUNSTON

Production Editor
ROY CASEY

IN THIS ISSUE

From All Quarters 396
Missiles and Spaceflight 398
Flight System Survey 401
Sport and Business Flying:
The British Scene 402
Business Flying in the USA 407
What Course for the Private Pilot? 413
"A Nation of Airmen"? 416
Flying Clubs and Groups in the United Kingdom 419
Straight and Level 420
Air Commerce 421
The Industry 426
Correspondence 427
Service Aviation 428

Iliffe & Sons Ltd, Dorset House, Stamford Street, London SE1; telephone Waterloo 3333. Telegrams Flightpres Sedist London. Annual subscriptions: Home £4 15s, Overseas £5. Canada and USA $15.00. Second Class Mail privileges authorized at New York, NY.

Branch Offices Coventry: 8-10 Corporation Street; telephone Coventry 25210. Birmingham: King Edward House, New Street, 2; telephone Midland 7191. Manchester: 260 Deansgate, 3; telephone Blackfriars 4412 or Deansgate 3595. Glasgow: 26B Renfield Street, C2; telephone Central 1265.

New York, NY: Thomas Skinner & Co (Publishers) Ltd, 111 Broadway 6; telephone Digby 9-1197.

© Iliffe & Sons Ltd, 1960. Permission to reproduce illustrations and letterpress can be granted only under written agreement. Brief extracts or comments may be made with due acknowledgement.

Sport and Business

IN dedicating this issue to "sport and business" *Flight* has scrutinized the British scene with special thoroughness. The brightening prospect that is apparent is partly attributable to a timely reinforcement of new American aeroplanes. But deeper satisfaction is to be found in the Government's unexpected awareness—expressed on page 416—of the necessity for heeding the pleas of the private pilot. There is encouragement, too, in the industry's late-dawning recognition of equipment needs. The statement by Geoffrey Rippon, MP, Parliamentary Secretary to the Ministry of Aviation, expresses the Government's hope that a new trainer/tourer will emerge which will do the nation credit; and the Standing Joint Committee on Private and Club Flying and Gliding is trying its hand at a "specification by committee." A specification for a light-aircraft radio was completed some months ago, but has not yet been published. It is urged in an article on pages 413-418 that this should be followed by further investigation by the joint committee into the radio aids so essential to regular business and touring flying. In this context Mr Rippon's support for VOR is heartening and he says it will clearly provide the standard aid for years to come.

Misgivings that the past and future efforts of the Standing Joint Committee might be nullified by the new Aviation Minister—as expressed in this issue by the aviation secretary of the Royal Aero Club—are in some degree set at rest by the Parliamentary Secretary's reassurance that the committee "should continue to play a valuable part in keeping the Minister advised of the problems of club and private fliers." It will not go unobserved, however, that the question "What are you doing at present to encourage the growth of private flying in Great Britain?" has evoked no reply from Mr Rippon. This he explains by presuming that the question was "directed specifically to the organizations representing private flying interests." For which, perhaps, there is some justification, having regard to the nature of a second question posed conjointly with the first.

In any case, in an issue devoted to the interests of sport and business flying the Parliamentary Secretary's sportsmanlike and businesslike response to a series of deliberately penetrating enquiries is one of the more cheering aspects.

Aspects of a Question

IN the recent Seventh Barnwell Memorial Lecture that most eminent Bristol aero-engineer Sir Roy Fedden deplored the "unbalanced statements" that he said were often made nowadays by the industry when a new development was just starting and could not be assessed as to its possible success or otherwise. The workpeople, he declared, had a considerable amount of horse sense on such matters, and if this practice became accepted it could subtly detract from the moral fibre of a company and do irreparable harm. Before the war Air Ministry Security would not allow this to happen.

These sentiments immediately recalled to us another recent pronouncement by one of Sir Roy's lineal successors—Dr S. G. Hooker—who, also in a lecture, set out in detail the whole of Bristol Siddeley's forward thinking in respect of air-breathing engines in aviation. The value of this paper is attested by its reception in the world's aviation Press; which does indeed prompt some reflection on issues of commercial and national security, while casting no reflection on Bristol for "unbalanced statements."

We must comfort ourselves here with the presumption that Bristol Siddeley know their business as the Ministry's security branch knows its own. Sir Roy's misgiving was nevertheless timely—and to be heeded.

FROM ALL QUARTERS

Equipment Manufacturing Policy

SOME idea of the Government's intentions as they affect equipment manufacturers in the aircraft industry was given by the Minister of Aviation, Duncan Sandys, when he spoke at the annual luncheon of the Electronic Engineering Association last week.

Commenting that he knew some of his hearers were worried lest recent mergers should have unfavourable consequences for them, and feared the big new groups would extend their activities further in the equipment field, Mr Sandys went on: "The Government's policy is to maintain in this country efficient capacity for the design, development and production of aeronautical equipment. It is not our intention to encourage airframe manufacturers to undertake work formerly done by specialist equipment manufacturers. But equally it is no part of our policy to try to prevent them from widening their range of business, provided they do so at their own risk and expense. The Government have invested large sums of public money in laboratories and other technical facilities at the works of the specialist firms. We certainly do not propose to duplicate these facilities elsewhere at public expense."

Mr Sandys commented finally that in development and procurement the Government's objective would be to obtain products "of the requisite quality produced efficiently at the lowest possible cost," and contracts would be placed with this aim in mind.

Rolls-Royce and MAN

CONFIRMATION of the rumoured agreement between Rolls-Royce Ltd and Maschinenfabrik Augsburg-Nurnberg AG is contained in an announcement from the British company. The two firms will share the financial and technical effort required to develop "small jet engines" (the RB.153 has been unofficially named as being a 4,960lb-thrust engine likely to be used in German VTOL projects).

Pirna 017

DETAILS are now available of the Type 017 gas turbine, latest product of the VEB (National East German aircraft industry) at Pirna, and readers may like to note the figures as an addition to our review last week of the world's aero engines.

The basic gas-producer has a centrifugal compressor and two-stage turbine; it operates at a pressure ratio of 3.1:1 and has a mass flow of 3.09lb/sec. At the maximum of 32,000 r.p.m., the shaft power is 130 b.h.p.

Fuel consumption of the basic 017D at full power is 171.6lb/hr and in this form, weighing about 221lb, the engine is planned for a variety of industrial and airborne applications. The 017E differs in having heat-exchange added to the work cycle. The compressor delivery is taken to a box-type heat exchanger on either side of the combustor. Each contains 70 layers of square-corrugated 0.008in stainless sheet (said to be imported from Austria since East Germany is not producing such material) operating at up to 700°C. The flow then reverses to pass through the combustion chamber and the turbine exhaust divides to flow transversely across the heat-exchanger cores. Weighing 440lb, the 017E has a reduced maximum consumption of 112.2lb/hr and is intended for many applications including the propulsion of helicopters and light aircraft. A prototype of this unit is said to have run for 1,200hr on the bench.

Bréguet Memorial Trophy

AWARDED annually by the Royal Aero Club for meritorious achievement in the development of VTOL aircraft, the Louis Bréguet Memorial Trophy for 1959 has gone to Dr J. A. J. Bennett, Professor of Aerodynamics at the College of Aeronautics, Cranfield, "for his exceptional technical contributions over the years to the rotary-wing art, and in particular for his basic conception of the principles embodied in compound rotor craft with fixed wings and propellers."

Intégral Ordered

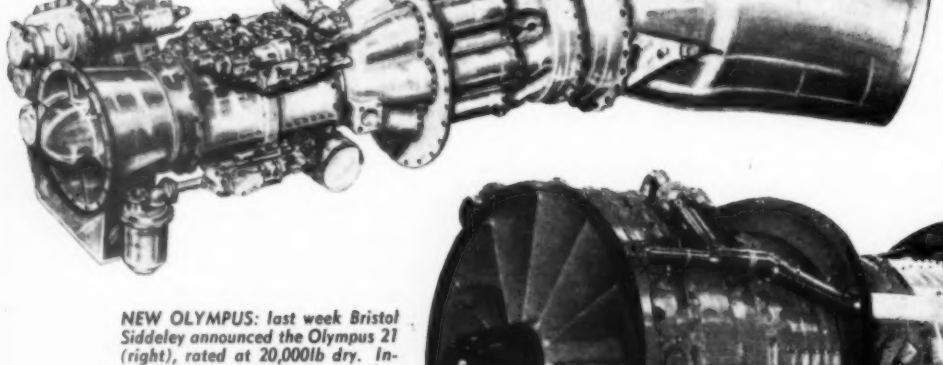
THE French Air Ministry has placed a development contract for the Bréguet 941 Intégral blown-wing STOL transport. Construction of the prototype has begun, and it is hoped to demonstrate it at the Paris Salon next year. Powered by four Turboméca Turmo IIIDs—the Government is said to have banned the D.H. Gnomes originally specified—and Ratier-Figeac propellers, the 941 will have the Messier "jockey" undercarriage, weigh 44,100lb, have a maximum payload of 13,230lb and carry 40 to 50 passengers. Cruising speed will be 215kt, stage length with 8,820lb load, 932 miles, and field length from 656 to 1,312ft. A pressurized version will be called 942.

The prototype 940, weighing 15,435lb and with 1,600 h.p., cleared 50ft after 623ft (278ft ground run); it touched down 328ft beyond a 50ft barrier and rolled for only 196ft.

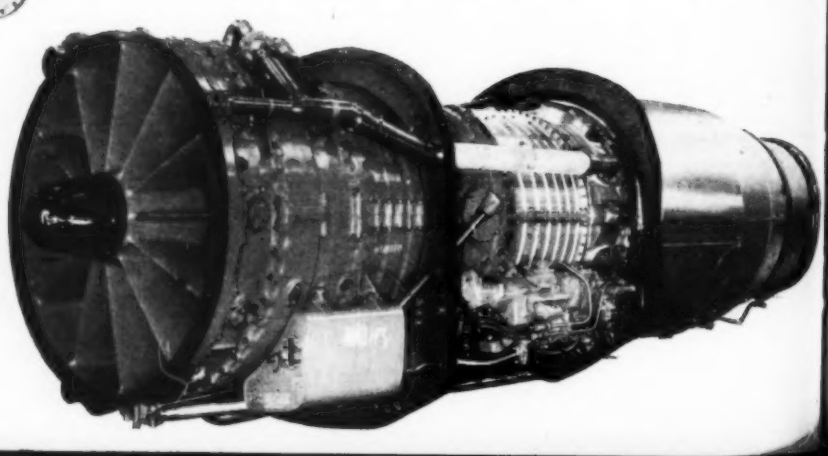
Supersonic Transports, Specific

PLOT a curve of the distance which, over the centuries, a man has been able to travel in 12 hours and a remarkably smooth rising curve can be drawn. Indeed, if it is plotted on a log scale, it is so straight that "I wouldn't dare to put it on the screen, as it would look fiddled." So said Sir George Edwards, managing director of Vickers-Armstrongs (Aircraft), in an address last Friday to the combined graduates' sections of the Institutions of Mechanical, Electrical and Civil Engineers. He was talking to them about the future of air transport.

He guessed that supersonic transport would come in about 1971 or 1972, and at a Mach number of about 2.2. "If you go faster with light alloy the thing melts . . . and in any case you may find that it will be faster to get there in a Mach 2.2 aeroplane which somebody knew how to design than in a Mach 3 aeroplane that somebody didn't."



NEW GAZELLE: first commercially certificated version of this Napier free-turbine engine, the Gazelle 511 (left) has a single swept jetpipe to suit installation in the Westland Wiltshire helicopter. Other changes include an axial intake, regrouped accessories and a smaller gearbox. Gazelles are being considered for current American helicopters



NEW OLYMPUS: last week Bristol Siddeley announced the Olympus 21 (right), rated at 20,000lb dry. Incorporating a zero stage, it has been developed "with a view to utilizing to the fullest extent the ultimate design potentialities of the Avro Vulcan"

This, it was clear, was Sir George's considered technical opinion; but how does Mach 2.2 in 1971/72 fit an extrapolation of that "fiddled"-looking straight line on the log scale? Sir George said: "A lot of us responsible for this supersonic transport business have been worried about the big jump involved," but he had "derived a lot of comfort" from the fact that a Mach 2.2 aeroplane timed for about 1971 or 1972 appears to lie on a "fair extrapolation" of the historic 12-hour journey curve.

Of the reshaped industry Sir George said: "We are now having our second wind." The changes would bring more stability and substance, and the reshaped industry was "working better already."

Supersonic Transports, Nebulous

DISCUSSION of Morien Morgan's lecture on *Supersonic Aircraft—Promise and Problems*, summarized on page 388 (and commented upon in a leading article) last week, was remarkable because no suggestions were made as to the Mach number at which a British supersonic airliner should be designed to cruise. The broad pointers in Mr Morgan's paper (and he was chairman of the Supersonic Transport Aircraft Committee) were not taken up, although Sir George Edwards warned that for the industry "to try to do something that it thought somebody else was going to do" might be a short cut "to falling flat on its face."

Other points made were that the market would be for about 150 aircraft, including 50 for the Commonwealth (Dr Russell, Bristol); a conservative size would mean more prototypes available for development (D. Brown, de Havilland); and that boundary-layer control could result in a useful saving in drag at the expense of some development time (G. H. Lee, Handley Page). Mr Morgan said that for a supersonic L/D ratio of 7 or 8, an L/D of about 11 could be achieved subsonically. A supersonic airliner need not be exotic and should have good low-speed control although changes in angles of attack might be large.

News of the Nipper

THE first Fairey Tipsy Nipper to be sold to a private owner in the United Kingdom, G-APYB, was handed over at White Waltham on March 14. The purchaser was Paul Bannister of Wolverhampton Aero Club, and a photograph of the aircraft appears on page 405 of this issue.

Other news of the Nipper is that is has been approved by the Popular Flying Association for amateur construction and issue of the PFA Permit to Fly. A PFA Tipsy construction group has been formed in Belfast, under the chairmanship of N. F. G. Harrison.

Air Touring Contest

FOUR trophies and £925 prize money are to be awarded at the Business and Touring Aircraft Competition organized by the Royal Aero Club on May 20-21 at Shoreham Airport. Regulations for the contest were announced last week by R. R. Stephenson, competitions and rallies secretary of the club.

A 400-mile course starting and finishing at Shoreham, with turning points at Lympne, Sywell and Filton, will be flown on the first day. For this a maximum of 1,500 marks will be given, based on a formula in which marks are proportional to (air miles per gallon)×(block speed)×(number of seats). On the second day five tests will be carried out: (a) short take-off (300 marks); (b) short landing (300); (c) engine starting (50); (d) manœuvrability (150); and (e) *concours d'elegance*, comfort and equipment, in which 200 marks are available for the comfort and convenience of the aircraft, 300 for its general condition and flight operating equipment fitted, and 200 for the baggage allowance per passenger.

Aircraft will be grouped in three categories: Class 1, for single-engined touring aircraft with up to two seats and not more than 2,204lb gross weight; Class 2, for single-engined business and touring machines with more than two seats, or between 2.204 and 12,500lb gross weight; and Class 3, for multi-engined business and touring aircraft not exceeding 12,500lb gross weight. Aircraft in the first two groups may refuel at Sywell during the first-day distance event. Entrants and pilots must be British subjects.

***FRENCH SEE FREIGHTER:** The rear fuselage frames of the SC.5 Britannic mock-up form a background to this group, photographed recently at the Belfast works of Short Brothers & Harland. Visiting the works were two French Air Ministry officials, M. Pierrat (left) and Col Soula (second from right). Between them is H. G. Conway, joint deputy managing director and chief engineer; the fourth member of the group is Col J. A. Stevens, the company's liaison engineer*

Chromatic Recognition

A NEW test, using coloured cine films, was introduced at the second Air-Britain national aircraft recognition contest which was held at Hammersmith Town Hall on March 12. Branch teams of three and individual members competed, winners of the Silver Hunting Trophy (for the highest-scoring team) being the Heston branch of Air-Britain, who scored 63 out of 90 possible points. J. Newton, of the Heston branch, won a special book award for the highest score (23) by a team member; and D. M. Stroud, of the London Society of Air-Britain, won the BEA Viscount Trophy for the highest score (25) by an individual participant. S. B. Oliver, Hunting Aircraft chief test pilot, presented the trophies.

IN BRIEF

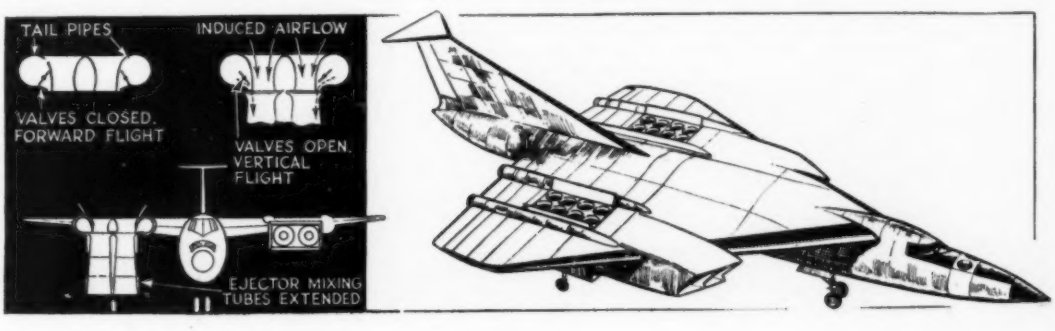
The US Federal Aviation Agency has approved Rolls-Royce Tyne Mks 506, 512 and 515 for civil operation.

The aviation division of Sir Robert McAlpine & Sons Ltd is to deliver an eight-seater Piaggio P.166 executive aircraft to John Laing & Son Ltd, building and civil-engineering contractors. Approximate cost of the aircraft, which is to be based at Luton, is £48,500 including full airline radio and navigational equipment.

On Wednesday of last week 29 air attachés representing 26 nations visited the Martin-Baker works at Denham. After a tour of the factory —which included a "ride" on the ejection seat test rig for all who wished—the party went to the company's airfield at Chalgrove, where they watched a low-altitude dummy ejection from a Meteor piloted by Sqn Ldr J. S. Fifield.

The magnitude of the German plan to manufacture the Lockheed F-104G seems likely to place a strain on that country's industry. Typifying the problems is the case of BMW, who will produce the General Electric J79 engine at Allach. To allow the rapid expansion needed the firm are seeking Federal assistance in doubling their capital, and numerous companies are attempting to form a liaison with them. Firms named include GE themselves, Bristol Siddeley, MAN and Fiat.

Helicopter tours over London are being offered from April 1 to October 31 by Executive Travel Ltd. They are being flown by Widgeons of Bristow Helicopters Ltd from the Westland Heliport at Battersea and follow the river route prescribed by the MoA. Standard tour (18-19 miles) goes as far as Greenwich and costs £5 10s per person; an alternative tour (nine miles, turning at Tower Bridge) costs £3 3s. Executive Travel, whose offices are at 91 Jermyn Street, London, SW1, also offer "package" tours of London (road and helicopter) and charters.



***INDUCED LIFT:** Sponsored by the US Navy Office of Naval Research, Hiller Aircraft are investigating annular-ejector systems whereby jet thrust can be used to induce additional flow for vertical lift. This is one of the transonic aircraft studied. Hiller are also moving ahead satisfactorily with the X-18 tilt-wing turboprop*

"Flight" photograph

Missiles and Spaceflight

THOR LOGISTICS

ON July 1, 1958, a button was pressed in Norfolk, causing a bell to ring in California. The button was at the first RAF Thor IRBM site at Feltwell; the bell was in the communications centre of the Headquarters of the San Bernardino Air Materiel Area at Norton Air Force Base; and the signal meant that the first automatic re-supply logistics system for a western ballistic missile was in business.

It is perhaps to be expected that the delivery of the 60th Thor to the RAF, reported last week, was the end-product of a complex yet well-coordinated background system of planning, shopkeeping and supply. What may be less obvious is the tight and immediate link between the bases in England and the SBAMA headquarters at Norton, a link which is more important, not less, now that three of the main bases are operational and the fourth has received all its equipment. The work of the Military Air Transport Service of the USAF also continues to be a vital part of the Thor programme, even if its mighty effort in the initial deployment of the missile is now complete.

In November 1956 a plan was approved for the logistic support system of the Thor IRBM (and for the Atlas and Titan ICBMs), a plan which was of necessity radically different from that applied to any previous weapon system. Unlike the aircraft which had preceded them, the missiles would have no flying-hour programme, no post D-Day support. The missile would fly only once—and then in anger—and its support system must guarantee the highest readiness 24 hours a day and 365 days a year. The system chosen had to be highly responsive and reflexive in reaction, and need the minimum administration at squadron level. The guiding principles adopted were:—

(1) Centralized knowledge of assets, so that the weapon support manager would have at his fingertips the complete world-wide logistic status for his weapon, and so be able to provide a highly responsive support service.

(2) Data processing. Only by using high-speed, electronic data-processing equipment could an up-to-date centralized knowledge of assets and reflex logistics be attained.

(3) Automatic re-supply. If the Thors were to be held at constant readiness they must be stocked with normal operational spares continuously, with a zero out-of-commission objective. The data-processing programmes were designed to relate spares consumption to levels and to ship automatically when levels reached re-supply points.

(4) Minimum administration at operational level. The business of the ballistic missile squadron was to maintain a constant state of readiness, and not to be burdened with details of stock record accounts, re-ordering, and other details. The electronic data-processing (EDP) equipment would centralize all record-keeping and so relieve the squadron of this work.

(5) Rapid communications, without which any responsive logistic system using EDP equipment would be ineffective. All squadrons, contractors and storage sites were to be directly connected with the EDP centre by transceiver and teletype.

(6) Air transportation, to be used extensively to ensure that the movement of replenishment spares was matched to all other phases of the system.

(7) Source direct to user, i.e., whether from USAF depot or contractor's plant, shipment was to be made directly.

(8) Maximum maintenance at squadron site, to minimize the costly and time-consuming movement of major items of equipment.

(9) Optimum use of contractors.

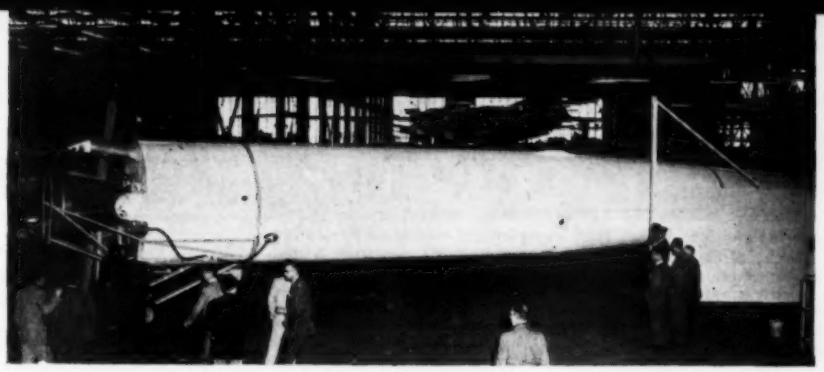
Towards the end of 1956 a small group began the job of defining the logistics parameters using EDP equipment. Systems designs in mid-1957 were concerned with requirements, "due-ins," levels, failures, etc. At the same time another group watched the R and D missile test programme to pick up hardware knowledge, while a third team provided the systems designers with technical logistics guidance. While the integrated EDP system was being finalized, logistics personnel were engaged in initial provisioning, technical data collection, cataloguing and the many other preparations for providing initial operational support to Thor and Atlas. Following the launching of Sputnik 1 the Thor programme was rapidly accelerated, which meant that this missile could not be supported initially by the integrated system planned. Hence Thor has, in fact, been supported by an interim, or "partial advanced" logistic system, while Atlas has had the benefit since its operational introduction last September of the advanced system.

The San Bernardino Air Materiel Area, a unit of Air Materiel Command, is commanded by Maj-Gen Ben I. Funk who, before his appointment to Norton, was commander of the AMC Ballistic Missiles Center at the Air Force Ballistic Missile Division at Inglewood, Los Angeles (a visit to which was reported in *Flight* of April 17, 1959). On January 1 this year "executive management responsibility" for Thor passed from the Ballistic Missile Division, a unit of Air Research and Development Command, to SBAMA, leaving BMD free to devote its attention to new projects while SBAMA looks after the Thor in service.

Earlier this month I visited SBAMA Headquarters at Norton and was able to learn at first-hand something of the work of Gen Funk's organization. The EDP centre is equipped with two IBM 705 computers and one Burroughs 220 machine, and accounts for some 35,000 parts on the Thor system (plus 56,000 parts on Atlas and 41,000 on Titan). About 225 skilled people are employed there, and computer rental costs, which include maintenance, amount to some $112,000 per month.

Main MATS air-freight terminal in the Thor programme is Dover AFB, Delaware, the scene of the heading photograph above showing C-124 Globemasters shortly before Operation Big Slam. Below, at Norton AFB, California, the C-124 which delivered the 60th Thor to England parks next to an experimental YC-97J powered by P & W T34 turboprops

"Flight" photograph



Right, Norton AFB received its first Thor in January last, becoming the first USAF depot to store and maintain ballistic missiles

Below, a C-133 Cargomaster of MATS undergoes a major inspection at Norton, headquarters of the San Bernardino Air Materiel Area

"Flight" photograph

These machines and men have established a new pattern of weapon management—in effect management by advanced electronics. The centre computes material and budget requirements; gives consistent, accurate data for the best and most economical use of all forms of transport; catalogues inventories, and preplans maintenance workloads. It makes possible worldwide accountability and control of assets, with automatic re-supply and accounting data that is completely up-to-date. Between the four Thor bases at Feltwell, Driffield, Hemswell and North Luffenham, and SBAMA at Norton, there is no intermediate point in the logistics network: the link is direct and immediate.

As a part of SBAMA's logistic responsibility for Thor, Atlas and Titan, missile storage and maintenance at Norton is included. The first Thor arrived last January and, as an official statement put it, "A full repair and modification capability will be phased in gradually at SBAMA. In part, this is the inspection and removal of components, check-out of sub-systems and purging and preservation of engines." An even more interesting part of this statement (to British eyes, at least) read: "Eventually there will be a steady flow of Thors to the base. They will be shipped as replacements as the missiles are fired by training squadrons at Vandenberg Air Force Base *and at launching sites in Great Britain*" (my italics). In fact, as has been reported previously in *Flight*, British crews will take their missiles to Vandenberg before practice-firing them (a Feltwell crew carried out a combat-training Thor launch—not with one of their own missiles—from Vandenberg on March 2).

As well as its missile management duties, SBAMA is responsible for the logistical support of C-124 and C-133 aircraft; and for technical assistance to operational bases of the Tactical and Strategic Air Commands in the area (Southern California, Arizona and Clark County, Nevada).

The total weight of missiles and associated equipment carried by air over the 18-month period which ended on March 10 with the arrival of the 60th Thor at North Luffenham has been variously quoted as "over 25 million pounds" (by Douglas) and 23 million pounds (by a USAF spokesman). This was in addition to 18 million pounds carried by sea. The air operation involved 600 flights by C-124 Globemasters and 77 by C-133 Cargomasters, and was the responsibility of the USAF Military Air Transport Service.

The Eastern Transport Air Force (EASTAF) of MATS has its headquarters and main passenger terminal at McGuire AFB, New Jersey, with its main freight terminal—stated to be the world's largest—at Dover AFB, Delaware. Here at Dover, the 1607th Air Transport Wing has been responsible for the air side of the initial deployment of Thor in the United Kingdom, culminating in the final missile delivery flight reported last week, and is now handling the routine supply of spares in this programme. The Wing comprises Squadrons 1, 15, 20, 31 and 40 equipped with C-124s, and No 33 equipped with C-133s.

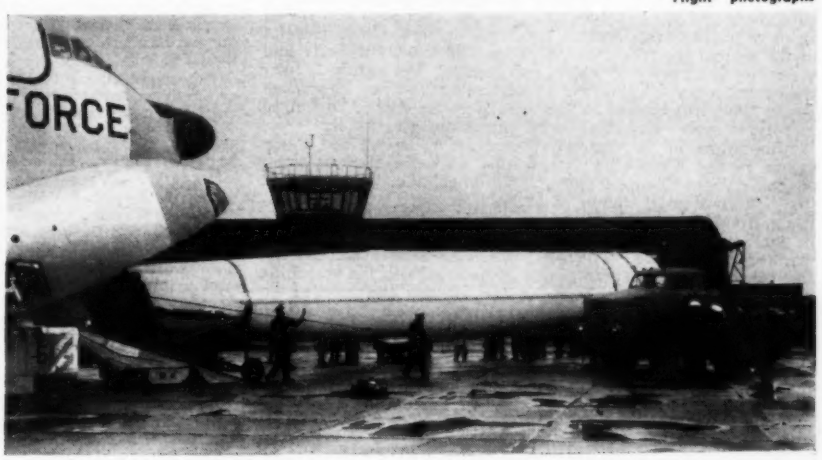
As indicated, most of the work has been carried out by the ageing C-124s, the all-purpose workhorse aircraft for which MATS is now demanding a replacement. Also being demanded—or politely requested—are a turbojet cargo aircraft and more large aircraft in the C-133 class. For each C-133 placed in service MATS has retired five C-54s, but its total eventual complement of the huge machines is only 50.

At the time of my visit to Dover, the 1607th Wing was preparing for its part in Operation Big Slam, in which 12,000 tons of cargo and 22,000 troops were to be airlifted to Puerto Rico and back during a 15-day period which ends next Monday. The normal MATS utilization rate is five hours per day per aircraft; during Big Slam this was to have been increased by the Wing to 8hr per day for 66 C-124s scheduled to fly a total of 8,160hr; and to 6hr per day for 12 C-133s flying 1,080hr. By comparison the Thor operation was a less intensive though more protracted exercise—even so, the impressive build-up of the programme led to a total of 80 delivery flights being made during one month, that of November 1958.

KENNETH OWEN

Commander of the San Bernardino Air Materiel Area, the primary US ballistic missile logistics centre, is Maj-Gen Ben I. Funk, seen (left) describing the work of his headquarters to Kenneth Owen of "Flight" at Santa Monica earlier this month. Right, end of an airlift: the 60th Thor for the RAF was unloaded from its C-124 at North Luffenham, Rutland, on March 10

"Flight" photographs



Missiles and Spaceflight . . .

PRINCESS SWITCHES PIONEER 5

During a visit to Jodrell Bank experimental station on Friday last, March 18, Princess Margaret pressed a switch to actuate a command radio signal for the transmission of data by the solar satellite Pioneer 5. At this time, 2.25 p.m., the satellite was 1,040,000 miles from Earth, travelling at a speed of 5,700 m.p.h.

Earlier the same day—at 2 a.m. local time (7 a.m. GMT)—a Washington Press conference had been called by NASA Administrator Keith Glennan to hear the first signals transmitted at a distance of more than a million miles by Pioneer 5.

The five-watt transmitter was switched on by command signal from South Point, Hawaii, when the satellite was 1,002,740 miles away. It was stated at the conference that tracking stations in the US, UK and Malaya had then received approximately 14 hours of telemetered data. The probe's transmitter was being commanded four or five times a day for periods of 15-20 minutes at a time. Signal strength had been good and the instrumentation appeared to be working well.

The internal temperature of the satellite was approximately 75°F, and external temperatures of the solar-cell paddles were about 27°F—both well within the design limits. The probe is scheduled to fly closer to the Sun (within 74.9m miles) than any previous man-made object, and within 8m miles of the orbit of Venus. Its region of exploration is the 26m-mile gap between the orbits of Earth and Venus.

MINUTEMAN FLIES—TETHERED

Boeing's three-stage solid-propellant Minuteman is regarded by the USAF as the most important strategic delivery system of the immediate future, and its development appears to be on schedule. The design parameters were fixed last summer, the airframe, guidance, propulsion and re-entry vehicle systems are all just a matter for proving and further refinement, and the most difficult problems—concerned with deployment—are being tackled by huge teams.

To prove the silo configuration a series of five boiler-plate missiles has been fired at Edwards AFB, the first being on September 15 last. On March 4 the sixth firing was made, and on this occasion the airframe was not a boiler-plate mock-up but the actual missile itself. The first stage was not fully charged, and the device was anchored by a 2,000ft nylon cable. Major subcontracts have now been let for the underground silos, launch-control communications and a railway transporter/erector/launcher system. It is suggested that the design of the train which will carry the railway Minuteman is at present "the longest lead-time item" (i.e., will take the greatest time to develop of any part of the weapon system).

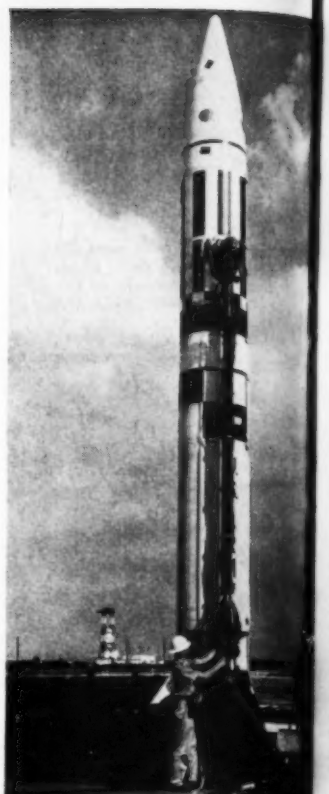
PERSHING IS A SCRAM

Now that it has entered the flight test phase, considerable additional information is becoming available on Pershing. Under development for the US Army by Martin's Orlando Division, Pershing is officially described as a SCRAM (selective combat range artillery missile). Basically Pershing is a two-stage solid-propellant ballistic weapon with all-inertial guidance. Designed to replace Redstone, the complete weapon system is smaller and less complex than that of its predecessor.

Essential elements of the system are the missile, XM474 tracked vehicles, a transporter/erector/launcher (or TEL), primary power pack, communications, fire control (computers, azimuth-laying equipment and other components), test and check-out gear for all levels of maintenance, and the necessary shelters. Characteristics of the system are reliability, short reaction time, simplicity and versatility in all types of terrain and climate. The system is fully transportable across country or by air, and the TEL, by Thompson Ramo Wooldridge, enables the missile to be erected and fired rapidly, to make "shoot and scoot" operations practicable.

All portions of the weapon system can be loaded and transported by the XM474. This is a fully tracked vehicle by Food Machinery and Chemical Corp, 202in long, 100in wide and 76in high. With a gross weight of 11,000lb, it can reach 40 m.p.h., has a ground clearance of 16in and can ford 42in of water. One of these vehicles carries the TEL, on which the Pershing, less warhead, is mounted. The TEL is electro-mechanical, and has four wheels of its own. On arrival at the firing site, the launching platform is first swung down to the ground and levelled on hydraulic jacks. The erector is then raised to place the missile on the launcher, where its position in azimuth is adjusted accurately prior to firing. The umbilical mast is a steel tube, the lower end of which is attached to the azimuth ring of the launcher while the upper makes numerous electrical and pneumatic connections through doors in the missile. Most of the checkout work is handled by the XM474-mounted fire-control hut. Just prior to firing, the umbilicals are automatically disconnected and the mast is thrown back only just far enough to allow the Pershing to leave cleanly. Since the mast is held near the vertical position it is undamaged and may be used repeatedly.

Pershing is some 32ft in length and has a maximum design range of about 700 miles. The initial contract was signed on March 25, 1958. Static firings began last April, and flight testing from the VLF-30 complex at Cape Canaveral started on February 24 of this year. For the fiscal year 1960 Martin have received $118m for continued development, and the major sub-contractors (apart from Thompson Ramo Wooldridge) are Bendix Eclipse-Pioneer (guidance), Thiokol (propulsion of both stages) and Bulova (adaptation kits).



As noted on this page, Pershing is now being flown from Cape Canaveral, where this photograph was taken

---

The first guided flight of a Temco Corvus (ASM-N-8) stand-off missile was made successfully at Point Mugu on March 15. The big supersonic cruise-type weapon was launched by a Douglas A3D-2M Skywarrior. The first unguided air launch took place from a Douglas A4D Skyhawk last July.

One of the largest subcontractors to Raytheon on the Hawk anti-aircraft missile, Northrop were on March 16 awarded a $22,647,800 contract for continued production. The company's Nortronics division is responsible for the mobile triple launcher and its loader, and major portions of the missile airframe, controls and transport pallet.

Speaking in East St Louis on March 5, Gen Thomas D. White, USAF Chief of Staff, pointed out that Titan has achieved a "six out of nine" score (this appears to ignore two rounds which never left the pad) and that the shot of February 24 (this page, March 4) "placed the nosecone on a target 5,000 miles from the launching pad."

Civil Lord of the Admiralty, C. I. Orr-Ewing, has said that sea trials of the Short Seacat will start this year. He was unable to confirm that the vessel employed will be the destroyer HMS *Decoy*. He went on to affirm that the *Tiger*-class cruisers will keep their 3in AA guns —"a modern weapon that will provide effective anti-aircraft defence for many years. . . ."

Five hours after the successful launch of an Atlas from Cape Canaveral on March 8 (this page, last week), a Titan C left on what was to have been a full-range mission. The second stage, however, apparently failed to ignite.

In our review of the world's missiles last November 6 we gave the weight of the Convair (Pomona) Red Eye infantry anti-aircraft missile as "under 20lb." Army witnesses in the US Senate recently gave the weight as 18lb.

It is unofficially reported from Washington that President Eisenhower or the State Department have, for the time being, quashed the plans of the USAF to fire an Atlas on a 9,000 mile flight from Cape Canaveral. Presumably employing the lightweight GE Mk 3 nosecone and simulated warhead, the missile was to fly down the Atlantic Missile Range and impact in the Indian Ocean, after passing close to Cape Town on the way.

The US Army announced on March 10 that the defences of Okinawa would be strengthened this year by eight Hawk emplacements. The Raytheon/Northrop weapon systems would fill in the low-altitude gap left by the Nike Hercules batteries already operational.

Interviewed by the journal *Nature* of the Soviet Academy of Sciences, Prof Boris Kukarkin, vice-president of the International Astronomic Union, is quoted by the news-agency Tass as having said that the accuracy of the Russian long-range firings into the Pacific "shows that it is possible for rockets to hit Mars or Venus at a prescribed position and time." He is further quoted as saying that "further important discoveries regarding the Moon can be expected."

According to Melvin Laird, a member of the US House Defense Appropriations Committee, "the US will by 1963 have at least 581 missiles ready for action, each capable of wrecking an entire Russian city." He claimed the Soviet Union would concurrently have 300 "capable of hitting the United States."

FLIGHT SYSTEM SURVEY

DMET Looks Less Certain

THE Air Navigation Commission of ICAO voted to standardize DMET by seven to three with two abstentions, but a proposal to standardize VOR-DMET-ILS was accepted only as a recommended practice, by six to three with two abstentions. The proposal to protect DMET until 1975 was carried by only five to four with three abstentions. The Council will thus have a far from unanimous brief for their final decision, due to be taken before April 9.

FAA Tries Pictorial Indicators

FOLLOWING 220 actual and 240 simulated flights using two different types of pictorial display with VOR and DME, the FAA Bureau of Research and Development has discovered the usefulness of pictorial navigation presentations. They have now issued a report on a six-week evaluation which forms part of a two-year programme seeking methods of improving display.

Two displays were used, one (made by the FAA) in which a spot of light and an arrow indicated the position and track of the aircraft and another (made by Avion) using a "bug" traversing the face of the map. Test flights were monitored by radar, the scopes being covered with a clear plastic overlay which duplicated the chart on the pilot's pictorial display. A plotting instrument operating from the radar, two cameras recording the scopes, and a camera in the pilot's cockpit, were synchronized to record simultaneously the radar track and the markers on the pictorial displays. During simulated flights electronic counters recorded communications data in contacts between pilot and controllers. In one series of flights accelerated approach-paths were directed by radar alone and in another pictorial displays were marked with preselected tracks and the pilot directed to follow one of them.

The first part of the test was intended to determine the accuracy with which aircraft equipped with pictorial display could be flown on designated courses, including approaches, departures and holding patterns. A second series of tests was to determine whether pre-drawn tracks on a pictorial display and surveillance radar could together reduce the communications work-load during accelerated approach procedures in high-density terminal areas.

The FAA statement on these tests says that "the pilots using the pictorial display were able to adhere to designated courses with a satisfactory degree of accuracy for traffic control purposes." The communications work-load was significantly lower, both the number and duration of radio messages being reduced by about 30 per cent. There was a "trend toward a reduced number of conflictions when . . . operating with pictorial display."

Short-range Aids Discussed

AT the third meeting of the Radar and Navigation Aids Group of the British Institution of Radio Engineers in London last week a number of significant ideas and trends were put forward. The topic for discussion was short-range navigation aids, the two principal speakers being E. W. Pike of General Precision Systems Ltd and E. R. Bonner of Decca Navigator Co Ltd.

Mr Pike began by saying that the term navigation aid was out of date because a complete navigation system was now required. It must be effective and controllers on the ground must be able to work with it. Basic requirements for the system were that it should be inherently reliable, light, simple to install, technically adequate and cheap. The airlines, he continued, had hitherto dominated the field too much and both military and light aircraft would have to be taken increasingly into account in future. Air traffic control must be flexible and it might be that rigidly delineated airways would have to give way to numbers of tracks.

Mr Pike defied any airline pilot to make a descent from 40,000ft to a pin-point at 15,000ft along a predetermined descent gradient. Changes in TAS, wind variations and other factors made this practically impossible. Vertical separation was fast losing its effectiveness.

All these factors meant that a simple, flexible navigation aid was needed and that horizontal, longitudinal and profile separation would be increasingly used. The ultimate factor in a navaid was *usable* accuracy and the presentation should be simple and unambiguous. Perhaps short- and long-range aids should now be called terminal and *en route* aids respectively. The former must be accurate in order to "derandomize the flow of traffic" near the terminal. *En route* accuracy was not so important.

Mr Bonner gave an account of the political history of the short-range navigation aid in ICAO and the USA, a well-rounded polemic to which subsequent speakers added a number of historical and operational details.

Mr Cook of the ARB then suggested that a critical balance must be struck between reliability and accuracy in the navaid in order to achieve an effective result. Someone should make a realistic assessment of these two factors. The only hope for collision avoidance in the terminal area was traffic control, but this had to be reconciled with flexibility. There were three choices: complete control by voice radio from the ground without an airborne navaid; automatic control from the ground, also without an airborne navaid; and concise instructions from the ground which the pilot carried out by reference to a navaid. Voice radio was slow and time-consuming and automatics were extremely complex. The navaid alternative therefore remained. Because a co-operative ground/air navaid raised political questions, independent aids such as Doppler, DR computers and inertial guidance might be considered. Some form of navigation computer would be needed and the introduction of Doppler was reviving such devices after a lapse of some years. Mr Cook concluded that the most dangerous procedure possible was to concentrate all aircraft in one place by means of a navaid.

Mr Smith of BOAC then stated that any aid would suffice for plain navigation from A to B. It was traffic control which determined the specific aids to be used. He felt that reliability was more valuable than accuracy. An unsupported computer was of no use for traffic control purposes.

A spokesman for Cossor then gave some details of further development of Gee involving use of extended base lines and forward scatter techniques at 200Mc/s to extend ranges to about 4,000 miles. A new aerial and receiver already produced had doubled the available range of present chains and the presentation was being changed from c.r.t. traces to left/right and distance-to-go meters.

Summing up, Mr Pike said that if traffic control was based on a navaid, that aid must be extremely reliable. The composite Decca DIAN was most attractive from this point of view. Radar capability might have to be re-examined. A funneled approach to a terminal caused difficulties and planned diversity was required. The pilot took traffic control extremely seriously and flying must be regulated by navigation in the air and control on the ground, with mutual trust between the two. Computers were increasingly important and someone would sooner or later develop a flight-management computer to supervise the complete operation of an aircraft throughout a flight. The only answer to international wrangling, continued Mr Pike, was co-operation at the early technical stage, so that the decisions would substantially have been taken before the question reached the ICAO arena. He finally paid tribute to the excellent analytical work performed by the MoA (and formerly as the MTCA) in preparing working papers for ICAO. They were greatly admired in other countries.

Bendix Collision-avoidance Progress

WORKING for the FAA's Collision Prevention Advisory Group, Bendix recently concluded a series of flight tests of their collision avoidance system. Initial details of this equipment were given in *Flight* for February 27 last year (page 296).

Some headway seems to have been made in this difficult task, mainly because Bendix have chosen a new and rather simpler approach to the problem than other companies. Basically, the system is co-operative and relies on a transmitter in each aircraft producing a series of pulses arranged in accordance with barometric height indications. Receivers in each aircraft then evaluate only those transmissions emanating from aircraft in the same height-band. Additional characteristics could be included in the pulse groups to indicate whether the aircraft was descending or climbing and whether it was a light aircraft fitted only with the transmitter element and therefore incapable of taking automatic avoiding action. A collision threat would be deduced by measuring the time difference in arrival of direct and ground-reflected signals from the pulse groups and establishing the ratio of range to rate-of-change of range. No attempt is made to predict a miss distance.

A collision threat would be deduced if the time to closest approach of one aircraft to the other was less than an arbitrary minimum and an alarm would be given to direct a predetermined upward or downward escape manœuvre. The direction of evasion would be decided according to the actual height indication received from the other aircraft. Ground-bounce ranging, as it is called, requires circuitry which might also be adapted for radio altimetry.

Bendix have equipped a DC-3 and a Beech aircraft to transmit at 440Mc/s and 1kW peak power and at 1,630Mc/s and 3.5kW peak power. The former was found to be more effective. A horizontally polarized clover-leaf aerial of about 8in diameter was used for 440Mc/s. The principle seems to have been proved and further tests are to assess the accuracy of the ranging. *Aviation Week*, giving these details, has reported that the full co-operative airborne equipment might weigh 80lb.

SPORT AND BUSINESS FLYING

THE current resurgence of interest in flying light aircraft, both for fun and for profit, is the subject of this special 18-page section of FLIGHT. Among the contents are a review of club and private flying in Britain, and one of business flying in the USA; ideas are put forward by FLIGHT on the subject of the future directions in which light aviation should develop, and further ideas have been contributed by the Ministry of Aviation, the Royal Aero Club, the Association of British Aero Clubs, and the Air League. The function of these pages is to inform, to stimulate thought, and to provoke action

The British Scene

BY KENNETH OWEN

PERHAPS it was the bright new US machines, whose engines actually started when you pressed the button, and which took you where you wanted to go quietly, without fuss, and brought you back smoothly on time without a drop of oil on your fingers, a crease in your suit or a hair on your head out of place. Perhaps it was the crisp aerobatics of the Continental pilots at Baginton. Or perhaps it was our own Tiger Club, whose members showed that you could do impossible things, even with a Tiger. Whatever the reason, you had just about had enough of the apathetic inactivity of British postwar light aviation, and the start of the 1960s seemed a good time to do something about it.

There were a lot of people already in the business thinking the same way. And there were lots of keen newcomers writing to *Flight* and saying "I want to fly, but. . . ." For all these people, as a background preliminary to the more controversial ideas which are aired later in this special section, it may be useful to present a basic review of the British scene as it is now.

The questions we hope to answer are the simple ones, yet the ones about which there is frequently the most ignorance or confusion. How much does it cost to learn to fly? Where can I learn to fly? What kind of clubs are there? What aircraft are available to the private and executive owner? How do I choose a suitable aircraft? How is business flying developing over here? Which organizations are involved, and what do they do, anyway?

Learning to Fly. How long does it really take, and how much does it cost, to obtain a PPL? The legal requirement is for a minimum of 40hr dual and solo flying training, which can be reduced to 30hr if an approved course is taken and completed within six months. Hourly rates at clubs in the London area vary from £4 for a Tiger Moth to £5 10s for a Chipmunk so that, in theory, one might spend a minimum of £120 and a maximum of £220 on flying training. Although the cost of qualifying will almost certainly fall somewhere within this range, the calculation is not quite as simple as that, and it is instructive to consider the experience of a number of clubs who have provided *Flight* with actual examples from their records.

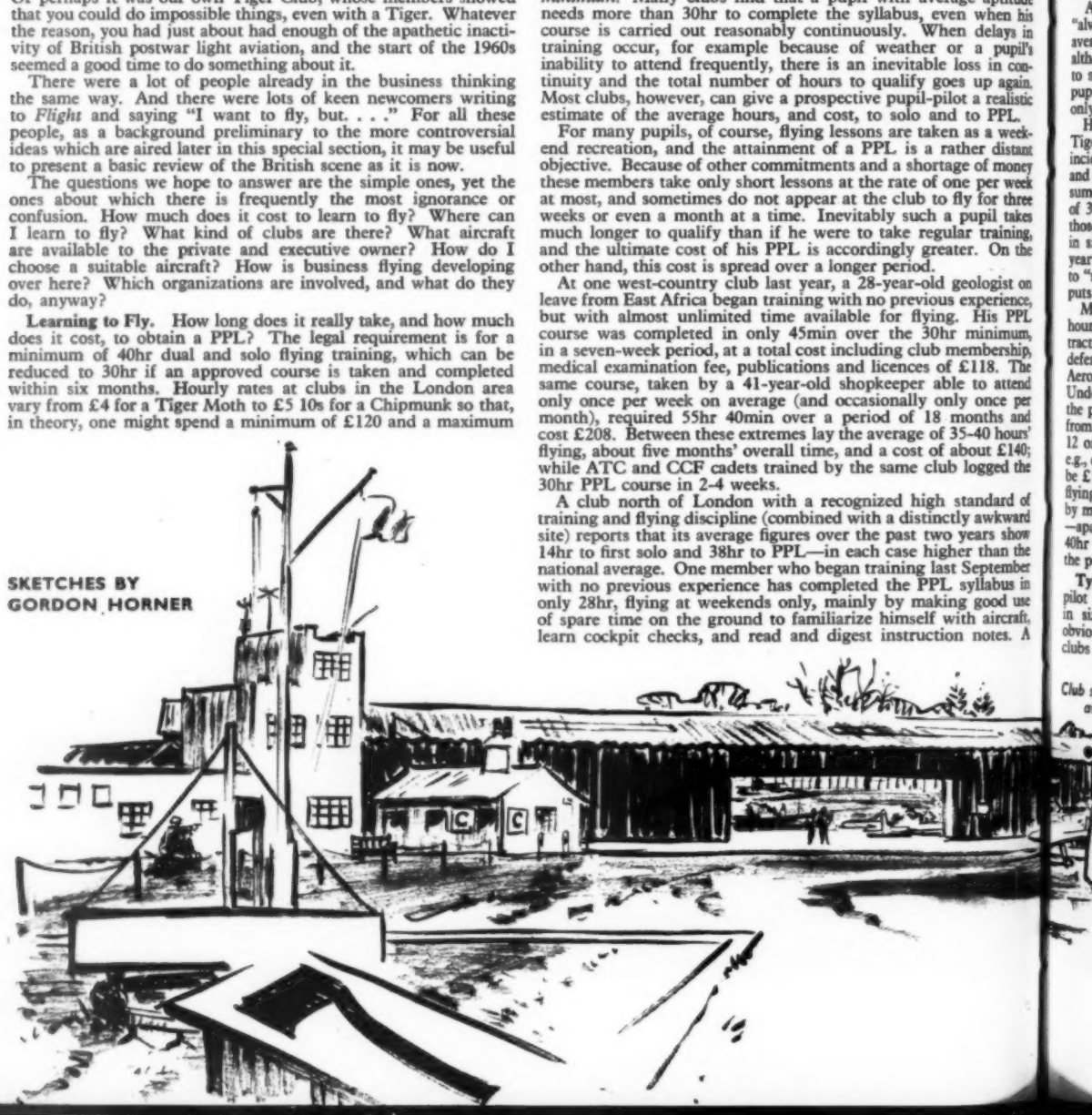
A basic point to bear in mind is that the 30hr figure is a *minimum*. Many clubs find that a pupil with average aptitude needs more than 30hr to complete the syllabus, even when his course is carried out reasonably continuously. When delays in training occur, for example because of weather or a pupil's inability to attend frequently, there is an inevitable loss in continuity and the total number of hours to qualify goes up again. Most clubs, however, can give a prospective pupil-pilot a realistic estimate of the average hours, and cost, to solo and to PPL.

For many pupils, of course, flying lessons are taken as a week-end recreation, and the attainment of a PPL is a rather distant objective. Because of other commitments and a shortage of money these members take only short lessons at the rate of one per week at most, and sometimes do not appear at the club to fly for three weeks or even a month at a time. Inevitably such a pupil takes much longer to qualify than if he were to take regular training, and the ultimate cost of his PPL is accordingly greater. On the other hand, this cost is spread over a longer period.

At one west-country club last year, a 28-year-old geologist on leave from East Africa began training with no previous experience, but with almost unlimited time available for flying. His PPL course was completed in only 45min over the 30hr minimum, in a seven-week period, at a total cost including club membership, medical examination fee, publications and licences of £118. The same course, taken by a 41-year-old shopkeeper able to attend only once per week on average (and occasionally only once per month), required 55hr 40min over a period of 18 months and cost £208. Between these extremes lay the average of 35-40 hours' flying, about five months' overall time, and a cost of about £140; while ATC and CCF cadets trained by the same club logged the 30hr PPL course in 2-4 weeks.

A club north of London with a recognized high standard of training and flying discipline (combined with a distinctly awkward site) reports that its average figures over the past two years show 14hr to first solo and 38hr to PPL—in each case higher than the national average. One member who began training last September with no previous experience has completed the PPL syllabus in only 28hr, flying at weekends only, mainly by making good use of spare time on the ground to familiarize himself with aircraft, learn cockpit checks, and read and digest instruction notes. A

SKETCHES BY GORDON HORNER



Druine Turbulent (30 h.p. Ardem engine) built by Rollason Aircraft and Engines, Croydon

38-year-old "average" pupil soloed in 11hr and obtained his licence after 36hr (and went on to take a part-share in a group-owned Auster). Among those who are taking a relatively long time over their training is one who has flown 38hr and has yet to solo because (according to the club manager) of an uncooperative attitude to his instructors.

This club previously operated Hawk Trainers and Austers but has replaced the former with Chipmunks. The time taken to solo and to reach PPL was on average 2-3hr longer before re-equipping, as the Hawk Trainer was trickier to fly and instruction was more difficult both to give and to receive in cold, open cockpits fitted with Gosport tubes. The average time to first solo on a Chipmunk is about three hours less than on an Auster, as the Chipmunk is stated to be more manageable in high winds, more responsive in handling, quieter and less tiring. Prospective members are told that the PPL course can be completed in 21 days' continuous training if all conditions (e.g., weather) are favourable, but that those not able to manage this should log a minimum of one hour per week if any continuity is to be maintained.

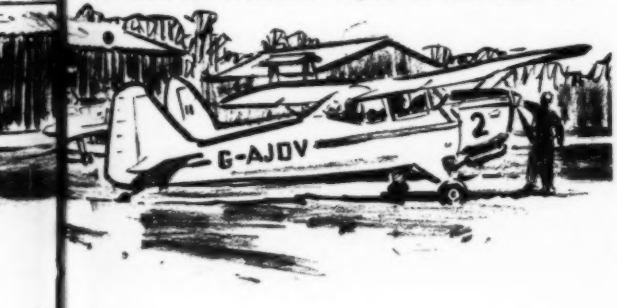
Another club near London quotes 21 days, 5-6 months, and "always longer than a year" as typical times taken for above-average, average and slow pupils to reach PPL standard—although the CFI recalls one member who took four years. Five to six months is stated to be the best that can be achieved by pupils who have not unlimited time for flying and can attend only at weekends or evenings.

Here again the minimum cost will be £120 for 30 hours' Tiger flying, or £157 on the Chipmunk, plus about £10 for incidental costs including club membership, medical fees, a helmet and publications. The flying-cost total is seldom paid in a lump sum, pupils usually paying as they go, and sometimes for a period of 3-4hr at a time. At this club the usual pattern followed by those who for financial reasons cannot complete the PPL course in six months is to take a concentrated ten hours' flying each year for four years, and for the remainder of each of those years to "sublimate their urge by talking flying to others," as the CFI puts it.

Many clubs offer "contract flying rates," under which a lower hourly fee is charged if a guaranteed number of hours is contracted for in advance. Another recent development is the deferred-payment scheme devised by the Association of British Aero Clubs in conjunction with United Dominions Trust Ltd. Under this arrangement a £5 enrolment fee is paid to the club, the pupil receives his flying training which is paid for by a loan from UDT, and repayments are made monthly over a period of 12 or 18 months. The interest rate is six per cent per annum, e.g., on a loan of £150 the total repaid on a 12-month basis would be £159, made up of 12 payments of £13 5s. As the number of flying hours required to reach PPL will almost certainly increase by more than six per cent when the course is unduly protracted—apart from the fact that the legal minimum rises from 30 to 40hr at six months—this scheme can be of obvious benefit to the pupil pilot.

Types of Club. Clubs and groups available to the prospective pilot are among those listed on page 419. They vary obviously in size, aircraft fleet, type of aerodrome, facilities—and less obviously in overall atmosphere or character. Some so-called clubs are in fact flying schools, while others pay much attention to social and other ancillary activities of an essentially "club" nature. Often it helps a club to have a large non-flying membership whose subscriptions and bar purchases can bring in useful extra revenue.

Club scene at Fair Oaks Aerodrome, Surrey, with a Chipmunk 22 and an Auster J1-N to the fore. "Flight's" Gemini is based here



The winner of the ABAC's Lennox-Boyd Efficiency Trophy last year was Exeter Aero Club, a good example of a club with wide and active non-flying interests to back up the flying side. Of a total membership of approximately 275 (which rises to just over 300 during the summer), 80 fly, 94 are social members, 89 play squash and tennis and 12 are members of the drama section. These categories are not self-contained, as many social members fly as passengers and some flying members participate in all the other activities.

An example of the flying-school or air-centre type of operation is that of Air Schools Ltd at Derby and Elstree. At Elstree, the London School of Flying has been formed to take over the operational activities of Elstree Flying Club, leaving the club to serve the social side only. At both Elstree and Derby (where the Midland School of Flying operates Derby Air Centre) pupils may learn to fly as air-centre members without joining any club. Another method of operation is that of Yorkshire Aeroplane Club at the Leeds/Bradford Airport at Yeadon, where club members (and club members only) receive their flying training with an associated company, Yorkshire Flying Services. The Yorkshire club has about 600 members, of whom 160 are flying members.

The three organizations directly concerned with the club and private flying in this country are the Royal Aero Club, the Association of British Aero Clubs and Centres, and the Popular Flying Association, each of which (together with the British Gliding Association) has two representatives on the Government's Standing Joint Committee on Private and Club Flying and Gliding.

The Royal Aero Club acts as the authority for sporting flying and aviation records in Britain (and is the British representative body on the Fédération Aéronautique Internationale). Full members have the residential and other facilities of the club premises at 119 Piccadilly, London W1; while associate membership (open to anyone interested at two guineas per year) provides the use of the RAeC Aviation Centre facilities at Londonderry House, 19 Park Lane, London W1. Members in both categories receive the *Royal Aero Club Gazette* (a *Private Aircraft Owner's Newsletter* is also published) and have available the advisory services of the Air Touring Department of the centre. The March issue of the *Gazette* is a special issue concerned with business flying.

Standardization of club operation is perhaps the main achievement of the Association of British Aero Clubs, whose address is 7c Lower Belgrave Street, London SW1. The Association's pilotage standards form the basis of the 30hr "approved course" for the PPL, while ABAC assistance is provided on all aspects of the formation and operation of clubs, centres and groups. Advanced courses, an instructor's course, a CPL course and an instrument-rating course have been devised and officially approved. Firms' flying clubs form a special "affiliate" section of ABAC membership while many of the smaller clubs and groups are associate members.

Both the ABAC and the Air Touring Department of the Royal Aero Club have a supply of maps, aviation publications, log-books and navigational equipment for sale to private and club pilots. While both organizations have broad aims which must be essentially similar—the healthy development of the light-aviation movement in this country—it is regrettable that in the past they have chosen to compete rather than co-operate with each other in achieving these aims.

[*Continued overleaf*

The British Scene . . .

The third-named organization, the Popular Flying Association, has its headquarters in Londonderry House and is affiliated to the Royal Aero Club. Successor to the Ultra-Light Aircraft Association, it is the guiding body for small groups who operate ultra-light aircraft (and who, by doing much of the work themselves, can reduce their operating costs in some cases to less than £1 per hour). A number of these groups have been or are engaged in constructing their own aircraft: the PFA has sold many sets of plans for the construction of the best-known postwar French designs but, although less-stringent airworthiness requirements apply in these cases, all too few actual aircraft have appeared.

Apart from individual club events, the main functions on this season's light-aviation calendar are as follows: April 18, RAeC business aircraft display, Goodwood; May 6-8, W. S. Shackleton sales weekend, Kidlington; May 20-21, RAeC business and touring aircraft competition, Shoreham; June 3-4, RAeC London - Cardiff air races, White Waltham and Rhoose; June 22-28, FAI aerial tour of Europe; July 8-9, RAeC British Lockheed international aerobatic competition and King's Cup air race; July 17, RAeC rally, Woburn Abbey; September 9-12, PFA international rally, Cranfield.

A new type of club has appeared on the scene in recent years which has done much to put new life into the sporting side of British light aviation. This is Norman Jones' Tiger Club, now based at Redhill and flying not only the venerable Tiger Moths—including specially modified aerobatic and racing versions—but a sprinkling of Turbulents and other British and French types. Membership is open to experienced pilots only who, in return for attendance for practice formation flights and in air-display demonstrations are able to hire aircraft at reduced rates and to participate in air races and aerobatic competitions.

Aircraft Types Available. For many pilots past the PPL stage, however, interest inevitably swings towards ownership of one's own light aircraft. In spite of the outraged cries of "restrictions" which until recently have been fashionable in this context, it is *not* impossible to purchase and operate a light aircraft effectively in this country. Certainly it is true that the numbers of light aircraft with current Cs of A on the British civil register—282 club and group machines, 45 training-school aircraft and 378 business and private—is pathetically small. But the number is rising as more company executives realize that modern business aircraft can mean good business (and business plus pleasure), and as impecunious enthusiasts appreciate that, perhaps by operating as a group, they can afford to operate an aircraft that is fun to fly.

What aircraft are available in Britain today? There is no doubt that the modern US and Continental machines, until last year unavailable over here, are catching on fast—particularly in the executive field. In this month's *British Register*, for example, we see that Whitbread & Co, the brewers, have a Tri-Pacer, and so has the Pressed Steel Co. The Earl of Derby has a Piaggio P.166, Constructor John Brown Ltd has a Cessna 310C, McVitie & Price, the biscuit people, own an Apache, and Woods of Colchester Ltd have a Beechcraft Travel Air. But let us begin here at home with the UK manufacturers.

Auster Aircraft Ltd, Rearsby Aerodrome, Leicester, are at present constructing a new series of light aircraft, details of which are here published for the first time. This series comprises the D.4/108, a two-seater powered by a 108 h.p. Lycoming O-235 and costing £3,020; the D.5/160, a three-seater powered by a 160 h.p. Lycoming O-320, developed from the Alpine and costing £3,300; and the D.6/160, a four-seat development of the Autocar, also powered by a 160 h.p. Lycoming (a 180 h.p. Lycoming version is planned) at a price of £3,832. The specification of each of these aircraft includes starter, generator, battery, dual controls, flaps, wheel brakes, floor carpets, extensive cabin soundproofing and "body-shaped seats of latest design."

Right, Hampshire Aeroplane Club Halcyon. Left (from the top), Bristol Chipmunk touring conversion, Aviation Traders Prentice, and Auster J5-L

Other current types available for sale in the familiar Auster high-wing configuration are the Workmaster 3-4 seater (180 h.p. Lycoming O-360, £4,500); J5-L aerobatic trainer (145 h.p. Gipsy Major 10, £3,700 or £3,125 with reconditioned engine); J5-P Autocar (145 h.p. Gipsy Major 10, £3,800); and the J1-N three-seater (reconditioned 130 h.p. Gipsy Major 1, £2,395).

Aviation Traders (Engineering) Ltd. (Prentice Division), Southend Airport, Essex, offer their touring version of the Prentice, powered by a 250 h.p. Gipsy Queen 30-2, in three internal configurations. The four-seater costs £2,000, the six-seater £2,050 and the seven-seater £2,250. Four-channel VHF radio is £50 extra.

Bristol Aircraft Ltd, Filton House, Bristol, are responsible for the attractive touring conversion of the D.H. Chipmunk illustrated on this page. The company, it has been unofficially reported, is also contemplating a completely new private/executive aircraft which may be a 5-6 seater cruising at 230 m.p.h.

De Havilland Aircraft Co Ltd, Hatfield, Herts, offer a number of possible versions of the Dove (2 × 380 h.p. Gipsy Queen 70-2) executive aircraft, with seating for four to 11 passengers. The standard eight-passenger machine costs £35,000.

The Garland Aircraft Company, Dale House, Clewer Green, Windsor, Berks. Successor to the Garland-Bianchi Aircraft Company, Garland Aircraft are offering the attractive Linnet version of the French Piel Emeraude, powered by a 95 h.p. Continental C90-14F engine, at a price of approximately £2,500. Plans for Bristol Aircraft to build 25 Linnets under subcontract for the Garland company have been proposed but, at the time of writing, not finalized.

Hampshire Aeroplane Club, Eastleigh Airport, Southampton, have fitted at various times a 35 h.p. JAP, a 60 h.p. Walter Mikron and a 60 h.p. Rover gas turbine to their new version of the prewar Currie Wot. Price of the Wot is approximately £1,000 (Lycoming- or Mikron-

Tight formation practice by three Turbulents of the Tiger Club at their Redhill base

powered), or £750 with a JAP engine. Now under construction at Eastleigh is the twin-engined Halcyon, powered by 60 h.p. Mikrons or 90 h.p. Rover gas turbines and illustrated in an artist's impression on the opposite page.

Jackaroo Aircraft Ltd, Thruxton, Andover, Hants, have available several variants of what is basically a four-seater conversion of the Tiger Moth. The club and private types are the Jackaroo 1 (Gipsy Major 1), £1,270; Jackaroo 1c (Gipsy Major 1c), £1,470; and Jackaroo 3 (Gipsy Major 10), £1,770.

Lancashire Aircraft Company Ltd, 7 Berkeley Street, London W1, have a product which is in effect a flying station wagon in the Prospector (formerly the EP-9), which is powered by a 270 h.p. Lycoming and sells at £10,000.

Rollason Aircraft and Engines Ltd, Croydon Airport, Croydon, Surrey, have specialized in rebuilding Tiger Moths and in producing several versions of the Druine Turbulent powered by Ardem engines, which are also Rollason-built. A rebuilt Tiger Moth costs £900 and a Turbulent £945 (30 h.p. Ardem) or £1,040 (40 h.p. Ardem). Turbulents are also available with closed canopy, wheel spats and brakes.

Tawney Aircraft Ltd, Stapleford Tawney Aerodrome, Essex, have under construction a new two-seat light aircraft, the Tawney Owl, powered by a 75 h.p. Porsche driving a pusher propeller. It is expected to cost between £2,000 and £2,500.

When US import restrictions in this country were eased, no company was as quick off the mark as Piper, whose British agents, **Vigors Aviation Ltd** of Kidlington Airport, Oxford, have since pursued an enlightened, energetic programme of sales by practical demonstration. The Piper range of aircraft is covered in the US section of this review on pages 407-412: current basic prices in the UK, duty paid, are; Comanche 180, £7,800; Comanche 250, £9,500; Aztec, £22,000; Apache, £16,800; Tri-Pacer 160, £4,555; Caribbean, £4,320; Super Cub 150, £3,900; and Super Cub 95, £3,205. Prices of all US aircraft can vary considerably depending on choice of equipment.

The UK agents for Cessna are **Airwork Services Ltd,** 35 Piccadilly, London W1, who also have been active in recent months. UK duty-paid prices include: Model 310C, £26,750; Model 150, £3,620; Model 172, £4,590; Model 175, £5,525; Model 180, £6,825; Model 182, £6,930; Skylane, £7,965; and Model 210, £10,215. The third in America's Big Three of light aircraft is Beech Aircraft Corporation, represented (rather quietly to date) in this country by **Aircraft Associates Ltd,** 26 Old Bank Buildings, Chester. Current prices, duty paid, of the Beech range are: Queen Air, £52,500; Travel Air, £22,850; Bonanza, £11,650; Twin Bonanza, £41,500; Super 18, £55,000; Debonair, £9,450.

Among other UK agents and distributors are **Aero-Enterprises (Borehamwood) Ltd,** representing Piaggio, whose P.166 6-8 seater powered by two 340 h.p. Lycomings has been chosen by several British customers over the last year at a duty-paid price of £37,220. The products of the Czechoslovak Aircraft Works—Meta-Sokol (140 h.p. Walter M332 engines, £4,400), L-200 Morava (2 × 160 h.p. Walter Minor 6-III, £17,750) and the Aero 145 (2 × 140 h.p. Walter M332, £11,750)—are distributed for Omnipol by **Aircraft and General Finance Corp Ltd,** 3 Red Place, Green Street, London W1. The attractive Fairey Tipsy Nipper ultra-light, a Belgian Fairey design powered by a 45 h.p. Stark Stamo engine, is marketed in Britain at about £1,150 duty paid by **The Fairey Company Ltd,** 24 Bruton Street, London W1.

A demonstration tour is shortly to be made here of the Polish PZL-102B Kos, powered by a 90 h.p. Continental engine and marketed by **Norco Engineering Ltd,** 62 Church Road, Burgess Hill, Sussex. The duty-paid price of £2,465 includes a useful amount of aircraft and engine spares. **Personal Plane Services,** 325 Staines Road, Ashford, Middlesex, state that they are agents for the Piel Emeraude aircraft built by the Rousseau company of Dinard, and that this aircraft will be available for delivery this summer at £2,500.

Rollason Aircraft and Engines Ltd of Croydon Airport, Surrey, are UK agents for Société Aéronautique Normande, and are currently offering the two-seat Jodel D.117 (90 h.p. Continental) at £2,600 including 11-channel VHF radio, the 3/4-seat DR 1050 (90 h.p. Continental) at £2,900 basic, and the 4/5-seat D.140 (180 h.p. Lycoming) at £4,620. As an incentive to purchasers, these prices include flying training up to PPL standard at any club in Britain. The US Mooney Mk 20 series of four-seat aircraft (180 h.p. Lycoming O-360) is distributed by **Travelair Ltd,** 115 Oxford Street, London W1.

These are the main types which are readily available in Britain at present. The availability of the foreign machines makes a potential purchaser's choice embarrassingly wide, and a logical source of impartial advice for would-be private owners is one of the main aircraft brokers. These companies can offer particularly useful assistance to those looking for a secondhand machine.

One such company is **W. S. Shackleton Ltd,** 175 Piccadilly, London W1, whose bright idea of an annual demonstration sales weekend at Kidlington has become an important fixture on the light-aviation calendar. Shackletons have produced two illustrated booklets which list the British and foreign aircraft available to the private and executive owner, and the brief details given in these often enable the purchaser to narrow his choice down to a few types. While the private owner will have fairly definite ideas on the performance he requires from his aeroplane, Shackletons have found that the choice of a company aircraft, on policy determined by a board of directors, may swing from an Alpine to an Elizabethan for the most untechnical reason.

Another firm of aircraft brokers is **R. K. Dundas Ltd,** 59 St James's Street, London SW1, which, with the help of its New York office, has specialized in recent months in the sale of secondhand Tri-Pacers. The first of these to be sold to a customer in Britain was a 1959 Autoflite Tri-Pacer which, with less than 300hr since new, full radio and navigational aids and many extras, was sold for almost £1,700 less than the new list price. The owner had previously operated a Messenger. For a large company, Dundas recently sold this firm's Dove and acquired for them a Cessna 310 on the grounds of higher speed, lower operating costs, better single-engine performance, smaller size and good looks.

[*Continued overleaf*

Left, the Fairey Tipsy Nipper from Belgium; right, the Jodel D.117 from France

Clockwise from top left; Super Aero 45, Piper Comanche, PZL-102 Kos, and Cessna 172 operated by Buonfortuna Ltd

The British Scene . . .

Operating Costs. A sizeable book could be written on the subject of the cost of operating one's aircraft once it has been purchased. There are broadly three types of private operation, each with its own level of costs.

The first is the executive aircraft run at a company's expense, equipped for regular all-weather operation and employing a professional pilot. The second is the private aircraft operated by a reasonably wealthy owner/pilot, maintained by professional engineers almost regardless of expense and equipped to the standard of the owner's ability as a pilot. The third type is the enthusiast's aircraft, usually owned by a pilot of limited means who carries out most of the aircraft maintenance, except for certification, himself. Group operation often has advantages here over individual ownership.

One can either tie-up a large capital amount in a new aircraft, with little subsequent maintenance, or one can buy an older machine quite cheaply in which case a heavy maintenance programme is involved. One enthusiast owner of a Proctor writes: "In my particular case the whole business is rather on a par with messing about in boats. You just have to enjoy maintenance as well as flying, or give up . . . you must be an engineer and be able to survey an aircraft in detail and buy without a C of A knowing exactly what you have bought. You must know the legislation and obligations attached to aircraft operation, and be able to do all kinds of engine and airframe maintenance."

A few examples may help to give an idea of typical costs. Hangarage for a light British twin may cost about £8 10s per month at a club airfield, and for a larger twin-engined type about £23 per month at a Ministry of Aviation airport. Assuming an annual utilization of 300hr the cost per aircraft mile for a Piaggio P.166 has been estimated at 5s 6d. Another example is provided by the makers of the Civil Prentice, who state that (assuming a 150hr utilization, engine checks phased with airframe inspections and a three-year C of A) the maintenance cost per flying hour will be 9s 6d and the total direct running cost per hour will be £4 19s.

Private and Business Centres. Developments at two aerodromes near London are indicative of the new atmosphere in British private and executive flying. These concern the establishment of improved facilities for private pilots at Biggin Hill, Kent, and the building up of Luton Airport as a nucleus of a business-flying centre.

At Biggin Hill, Surrey Aviation Ltd are doing their best to make up for the lack of facilities following the closure of Croydon Airport last year. At present the company has the use of two of the airfield's three runways, and is negotiating with the Air Ministry for the third, which is 2,000yd long. A new control tower is now under construction and DF equipment is to be installed in it.

Two of the directors of Surrey Aviation are J. R. Maitland and Edward Drewery, whose company, Maitland-Drewery Aviation, supplies a charter and "fly yourself" aircraft hire service at Biggin. This company uses a Czechoslovak Aero 45 and two Prentices, and plans to enlarge the fleet in the immediate future to include six Champion Tri-Travellers and a number of Chipmunks. If official support is given to the efforts of Surrey Aviation at Biggin Hill, this ex-RAF airfield could indeed take the place of Croydon.

The company concerned with the business-flying development at Luton Airport is the Aviation Division of Sir Robert McAlpine and Sons Ltd, who have for 15 years operated their own business aircraft. Their first machine was a Gemini, and their current fleet comprises a Piaggio P.166, Cessna 310C, D.H. Rapide and Lockheed 12. The company's aviation manager is Capt Ray Young, formerly with Jersey Airways, and the maintenance department has a chief engineer and five other licensed engineers. The firm is the official Piaggio spares stockist in this country, and has sold a number of P.166s.

The division's work is twofold, involving the normal type of executive flying for the personnel of the parent company, and in addition the recently expanded advisory and maintenance service provided for other companies operating their own business aircraft.

The Piaggio P.166 operated by McAlpine Aviation at Luton Airport, seen outside one of the company's hangars there

A Fairchild F-27 (two Rolls-Royce Darts), owned by the Champion Spark Plug Company, in a setting which epitomizes the subject of this article

Business Flying in the USA

A STUDY OF "CORPORATE" OPERATIONS AND EQUIPMENT - - - - - By DON ADAMS

ALTHOUGH the major civil aviation news which emanated from America during 1959 concerned the introduction and early service use of the big turbojet-powered transports, equally important—if less headlined—news was being made in the somewhat less glamorous field of business aviation. The year saw marked expansion in all facets of business transport. According to the National Business Aircraft Association, US business aircraft operators flew a total of 5.7 million hours and 855 million miles during 1959. The hourly total represents approximately 50 per cent more hours than were flown by the combined fleets of all regularly scheduled domestic airlines. Expressed in another manner, America's business fleet recorded a total of 36.3 million million passenger-miles in 1959.

Aircraft, of a wide variety of models ranging from single-engined light types priced at under $10,000 each to large multi-engined, turbine-powered transports costing in excess of one million dollars, were produced in unprecedented numbers. Final figures for the year indicated that total "utility" aircraft sales were 7,689 units,* a number 20 per cent in excess of the 1958 total. These aircraft had a total net billing of $129,876,000, compared to $101,527,000 (for 6,414 aircraft) in 1958. Over 1,000 of those sold in 1959 were of the multi-engined type.

The year also saw initial deliveries of new turboprop transports for executive use. Fairchild Engine & Aircraft Corporation turned over fifteen F-27s to corporate users, while Grumman Aircraft had produced some 28 Gulfstreams by the year's end. Both aircraft are powered by Rolls-Royce Dart engines, and owners of these turboprops are reportedly as enthusiastic about the performance of their powerplants as are the airlines who operate similarly powered Vickers Viscounts. For the speed-conscious business aeroplane operator, both the Lockheed JetStar and—to a lesser degree—the North American Sabreliner are being offered for sale. Initial production of the JetStar—some forty of which are reportedly on order—is programmed for this year.

Manufacturers of airborne electronic aids also enjoyed banner years, as did most of the repair and overhaul shops. Airport operators joined in the boom by selling 138 million gallons of fuel and 2.1 million gallons of oil. And 1960, barring some unforeseen calamity, promises to be an even better year for those who supply equipment and services to owners of executive aircraft. Some estimate that sales of business aircraft will this year reach a figure of 8,000 (these aircraft to cost over $200 million).

Numbers of Aircraft in Service The October 10, 1958, issue of *Flight*, the previous special Business and Touring Aircraft Number, cited statistics prepared by the NBAA which indicated the total number of aeroplanes then in service. It is interesting to compare the NBAA's latest figures with their earlier estimate:—

Class and Type	Numbers of Aircraft in Service at January 1		
	1958	1960	Net Change
I. Multi-engine (9 place and over)	1,041	750	−291
II. Multi-engine (under 9 place)	2,304	5,040	2,736
III. Single-engine (3 place and over) ...	13,852	18,500	4,648
IV. Single-engine (1 and 2 place)	8,796	3,950	−4,846
V. Miscellaneous	155	—	(−155)
— Helicopters	—	78	(78)
Totals	26,148	28,318	2,170

The most startling increases in numbers of aircraft were noted in Classes II and III (just why reductions were noted in the two remaining major categories will be discussed shortly). Responsible for the expansion observed above has been the amazing growth and popularity of small, relatively inexpensive, business transports. This interest has been stimulated, no doubt, by the proven safety records achieved with the newer types in recent years. But not only are business aircraft now safer; they are a pleasure to fly. One has only to read *Flight's* appraisal of two new Piper aircraft (see issue of November 13, 1959) to appreciate how much of a joy modern flying can really be. With decorative interiors in the new aeroplanes—quite comparable with those available in the finest automobiles—it is possible for the travelling

*This figure excludes sales of the F-27 and Gulfstream.

Executive DC-3 conversion by Atlantic Aviation Corp

Production-prototype of the Lockheed JetStar

Sport and Business

Business Flying in the USA . . .

executive to step into his aeroplane while wearing a business suit rather than old sports clothes. He can complete his flight under relatively relaxed conditions and step out at his destination no more weary—and perhaps a good deal less—than if he had driven his automobile for a similar period of time. More executives fly their own small aircraft today because of the rapid improvement in safety and comfort; little of the increase can be attributed to superior performance. Certainly the small increases in speed in recent times (in the lightplane field) have had little to do with the increased popularity of business transports.

How comes it, then, that reductions have been noted in Class I (the heavy twins) and Class IV (the one- and two-place single-engined aircraft)? These are special cases, the pure statistics on which do not reveal the true state of affairs. A drop was recorded in Class I because most of the aircraft previously (and indeed currently) registered in this category are of the DC-3 type.* As was indicated in *Flight's* previous business aircraft issue, most of these aircraft were purchased at ridiculously low prices in the early post-war years. Not surprisingly, many were (and still are being) operated by firms perhaps too small to justify the use of aircraft of DC-3 size *except* on the basis of low purchase price. Logically, when such aircraft show signs of wear (which even DC-3s do) their owners are unable to find replacements inexpensive enough to meet their limited budgets. While the more affluent companies have replaced their DC-3s with even bigger and several times more costly aircraft, the smaller organizations have stepped down somewhat in their requirements and have purchased a light or medium twin. And since the really wealthy companies are in a minority, it is easy to understand why the total number of large aircraft in service has declined in the past two years. This process can be expected to continue for perhaps several more years until many of the DC-3s have been retired and replaced by new (small or large) types. At that time the total number of Class I aircraft will probably remain constant for a short period and then rise again in subsequent years. With the extraordinary lives being built into large new turbine aeroplanes —the Gulfstream, for example, has a proven fatigue life of 44,000hr —few of the newer types will be retired and it is likely that there will be a steady increase in total numbers of heavy twins in service in the middle sixties. Ultimately, it would not be at all surprising if there were more large executive aircraft in service than there were scheduled airliners.

A slightly different reason accounts for the drop noted in Class IV. Many of the lightplanes in this category were constructed in the late forties, before manufacturers became acutely aware of the need to have really attractive interiors in their aircraft. Sales of private planes increased when automobile-like comfort was provided. The older aircraft are also wearing out and it can be expected that this class will evidence a reawakened interest in forthcoming years. It can safely be predicted that substantial numbers of small two-place aircraft will be turned out in the next few years. The remarkable public response which greeted the reintroduction of the inexpensive Cessna 150 last year supports this prophecy.

All indications are that there will be an even greater boom in executive aviation in the next decade. The lingering effects of America's business "recession" have been wiped out, and a healthy economy is bound to create additional impetus for the growth of business transport. What manufacturers and aircraft will receive the benefits of this boom? A large number will do so, some more than others. Below are a few pertinent (and necessarily personal) comments about the most favoured contenders for sales.

**In September 1959 the FAA had registered some 486 DC-3s (and C-47s) in their "non-air-carrier" listings.*

The Heavy Twins The most important news in the heavy-twin field is likely to centre on the Lockheed JetStar. Product of the Marietta, Georgia, facility of the West coast firm, the JetStar is scheduled to make its inaugural flight—in production form—in July. Pratt & Whitney will receive the initial model and install four of their own JT-12 (military J-60) turbojets. Following engine trials, the aircraft will be returned to Lockheed for certification. The first certified production machines will be delivered to the Continental Can Company in January 1961. Lockheed's ten-passenger jet transport will be offered mainly in the four-engined version; but the company is quick to add that twin-engined models, powered by Bristol Siddeley Orpheus, will also be available. Attesting to the reliability of the Orpheus variant are Lockheed press releases which note that during "intensive flight evaluations" with the two Orpheus-powered prototypes the aircraft flew a total of 70,000 miles in 53 days. "Not a single day's flying was missed because of maintenance problems," said a Lockheed spokesman.

But even aside from the switch in emphasis from two to four engines, production JetStars will differ considerably from the two prototypes which have been touring the US on sales demonstrations. Addition of thrust reversers (P & W designed) will cut the JetStar's landing distance by several hundred feet. Both landing and take-off distances will be further reduced by the inclusion of high-lift edges (slats). Dual mainwheels and nosewheels have also been added to production models. With these improvements, the JetStar's take-off weight will be raised to 28,000lb. Coast-to-coast non-stop flights should be possible with auxiliary tanks, which further increase take-off weight to 38,000lb.

Grumman Gulfstream

Convair executive by Frederick B. Ayer & Associates

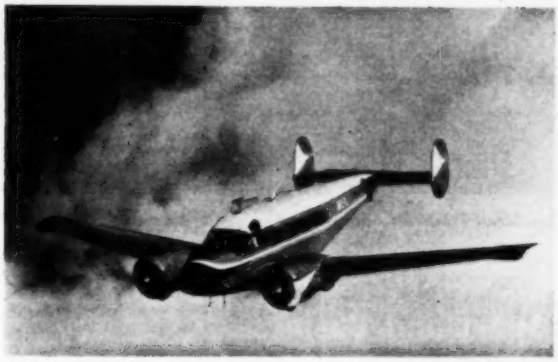
The Air Force recently announced that the JetStar had been declared winner of the competition for a utility jet transport (*Flight*, October 23, 1959). No total numbers of aircraft involved were mentioned, but this long-awaited order justifies Lockheed's decision to proceed on the basis of civil orders alone, and should permit the company to make money on a selling price of around $1.1 million for the executive aircraft. According to a recent article in *The Wall Street Journal*, Lockheed has firm deposits for "some two score" aircraft. Other sources report sales of at least twice that number of aeroplanes. Announced purchasers of the JetStar include the Canadian Department of Transport and the James A. Ryder Trucking Firm, as well as the two previously noted companies. Confirming a move reported in *Flight* for October 10, 1958, Pan American recently announced that they would purchase a fleet of JetStars and lease them to corporate users.

But while the Lockheed programme is evidently proceeding quite satisfactorily, the aircraft that had been expected to compete heavily with the JetStar for both military and executive orders—the McDonnell 119—has fared less favourably. First flown on February 13 of last year, the McDonnell aeroplane—which was designed to an identical specification—has four podded engines (JT-12s in production models—the prototype first flew with Westinghouse J-34s) in the style of the big American jets. It is highly likely that Lockheed's considerable civil-transport reputation and organized sales group enhanced their competitive position and won for them many coveted orders. With the initiative now firmly in the company's grasp it would not be surprising if the McDonnell project were eventually cancelled, leaving Lockheed as the sole contender in the turbojet business-transport field; but there is still a possibility that the Air Force may award McDonnell a token order for several aircraft, thereby keeping the project alive and forestalling cancellation.

Competing with the JetStar for executive sales are several turboprop-powered aeroplanes. Newest of the contenders is the Grumman Gulfstream (*Flight*, April 3, 1959). Powered by twin Rolls-Royce Mk 529 RDa.7/2 engines, the Gulfstream is an aeroplane of DC-3 size capable of 350 m.p.h. flights (at somewhat less than US coast-to-coast ranges) with 12 passengers. Production Gulfstreams are being delivered at a rate of three per month, and total sales are reported to be in excess of 40. "Basic" price (which includes basic flight—but no special—navigation and radio equipment) is $895,000. Among reported buyers are the Sinclair Refining Co, Harold G. Vanderbilt, Texaco, General Foods, General Electric Co, Continental Can Co and the Continental Oil Co.

A second Dart-powered heavy twin is the Fairchild F-27. Larger and heavier—but less expensive—than the Gulfstream, the F-27 offers nearly 300 m.p.h. and an airline-size interior to the executive in need of short-to-medium range transport. Fairchild reported last year that 24 business aeroplanes had been ordered by interested corporations. Among the buyers was the Continental Can Co, who, having now bought a JetStar, a Gulfstream and an F-27, must be fair game for anyone having a new aeroplane to sell (if only the airlines could settle their equipment-purchasing decisions in such a simple manner)!

Most of the orders for the Gulfstream and F-27 had been placed some time ago; relatively few additions have been announced in recent months. Two separate conditions brought about this situation. The first was Lockheed's decision to proceed with the JetStar programme without awaiting a military order (which, as observed, was subsequently forthcoming). The second is the large number of surplus Convair 240/340/440 aircraft now being offered for sale by the airlines or their brokers. The JetStar captured a number of buyers who might have otherwise bought a Dart-powered aeroplane; but, a possible effect of the Lockheed announcement to proceed with production was to cause a lot of prospective buyers to sit on the fence until the production JetStar is available for personal inspection. Rather than compare a "paper" JetStar—the prototypes were not really representative in respect of take-off and landing performance—with off-the-shelf Dart-powered aircraft, it may be that many customers are still waiting to make a decision.



Beechcraft Super 18

Aero Commander 720 Alti-Cruiser

These fence-sitters may therefore consummate their purchases later this year after the JetStar has flown. Whether the JetStar or the turboprops will eventually win most of the sales is difficult to guess. But if Lockheed's aeroplane turns out to be as good as its makers pronouncements say it will be, Fairchild and Grumman may face an uphill struggle in their sales efforts. Prospective buyers are heaviiy influenced by airline publicity about the jet transports.

The increased availability of surplus Convairliners must be distressing to all three manufacturers. Made prematurely obsolescent by the introduction of the big jets (and the consequent intrusion of big piston-powered aircraft on shorter routes), the Convairs have been receiving a good deal of attention from the business world in recent months. Primarily responsible for this interest, of course, is the extremely attractive price of used Convairs, which in most cases has been less than $400,000. Business operators can thus obtain a really useful aeroplane for less than one-half the price of a new turbine business transport. It must indeed be tempting to consider buying a used—but by no means worn out—aeroplane at such a bargain price.

Other competitors in the heavy-twin field are the brand new Canadair (Convair) 540, with its Napier Eland 6s, and conversions of the Convair 440 with Allison T-56s. Interest in these aircraft, however, appears to stem mainly from airlines anxious to offer "jet" transportation to keep in tune with the times. The 540 is said to cost $1.3 million (in the executive version), while the T-56-powered aeroplane can be purchased at a somewhat lower—but

Beechcraft Queen Air

Beechcraft Twin-Bonanza

Beechcraft Travel Air

Cessna 310D

Piper Aztec

Sport and Business

Business Flying in the USA . . .

still high—price. These facts tend to dim the attractiveness of the Convairs for business operators, although the engine change certainly produces worthwhile benefits for the airlines. Additional competition for new turbine sales occasionally arises in the shape of used Vickers Viscounts. A few of these are being utilized for executive transport in America, the most recent acquisition being an 810 model by the Tennessee Gas & Transmission Co. Half-a-million dollars was the price recently quoted for a used Viscount. Another possible contender for heavy-twin sales is the Avro 748, which will probably be available at a price less than that of the Gulfstream or F-27. Occasionally one can read of the purchase of a modified bomber—a B-26, for example, but not much interest is now evinced in such projects. Some converted Lockheed Lodestars still find their way into the executive market. Most popular of these are the PacAero Learstar and the Howard 500. Approximately 43 Learstars are now in service.

The Medium Twins Although not strictly deserving a class of their own, several twin-engined aircraft intended for the business world are really not large enough to be called a heavy twin nor light enough to be called a light twin. Foremost in this medium category is the Beech Model 18, offered in 1960 as the Super G18. No fewer than 89 Model 18s were sold last year. Following automotive practice, most aircraft manufacturers now offer annual improvements in their products. A slightly roomier and larger cockpit is the most notable difference in the new Twin Beech. Costing $126,000, the G18 is fitted with P&W R-985 engines (producing 450 h.p. each) to give a cruise speed of 214 m.p.h. Stand-by rocket power, in the form of Aerojet solid-propellant charges, can be installed at the buyer's option to produce emergency thrust. Few people, however, currently show interest in such devices. Heaviest of the 1960 Beech fleet at 9,700lb, the G18 has been equipped this year with a two-piece glass windshield for improved visibility.

A favourite topic of conversation among owners of Twin Beeches is the question of if and when some engine manufacturer will develop a small turbine (preferably a turboprop) which will be sufficiently cheap to permit its installation in a medium-cost aircraft. A great potential market exists for a firm which can offer an eight-place aircraft with turbine power for a price of less than half-a-million dollars. *The New York Herald Tribune* reported in February that Beech would introduce in 1961 an eight- to ten-place, 400 m.p.h. turboprop-powered aircraft selling for exactly that price. *Aviation Week* echoed this view recently. Whether or not these reports prove true is conjectural, but there is no question but that Beech, for one, would dearly love to see the statements come true.

A possible candidate for eventual application in a medium twin is the Canadian P&W PT-6 turboprop. Producing 500 e.s.h.p. and weighing less than 250lb, this engine is "intended for use in light and medium single-engine aeroplanes" in addition to the medium twins. Minimum expected time between engine overhauls is promised to be 1,000hr, a figure which would be welcomed with open arms by the business world. Also on the plus side for this Canadian product is a good s.f.c. value of 0.69. Studies of the PT-6 began only as recently as October 1958, but development testing is now well under way and prototype engines should be available by 1961. If, as rumoured by some, the engine can be marketed for $15,000, it would not be at all surprising to see the earlier prognostications come true. Another engine possibility is the Allison 250 h.p. turboprop with its s.f.c. of 0.76 and weight of 110lb.

For the business aircraft operator anxious to own a medium-sized jet transport there is a possibility that the North American Sabreliner, a twin JT-12-powered aeroplane, will be available in early 1962. North American was recently awarded a contract by the Air Force for 35 more aircraft, bringing to 42 the number of Sabreliners now on order. Bearing the designation T-39, the Sabreliner is basically a four-passenger, 500 m.p.h. aeroplane which will be used by the Air Force for training and high-speed transportation. But no really substantial executive sales are envisaged for the T-39, because of what will probably be a price tag in the vicinity of one million dollars. The aeroplane is perhaps too small to attract substantial customers. Not to be overlooked, though, would be a stretched version seating seven or eight people.

Another interesting aircraft in the over-$100,000 medium-twin class is the Aero Design Model 720 Alti-Cruiser. Unusual among the piston-powered twins in that it has full cabin pressurization—the only existing new production business twin so fitted—the 720 sells for $183,750 fully equipped. Twin Lycoming GSO-480-BA16 engines rated at 320 h.p. push the 720 along at the respectable speed of 227 m.p.h. at altitudes as high as 16,500ft. Only a few Alti-Cruisers are yet in customers' hands and it is difficult to speculate on what total sales which eventually materialize. It might be, however, that the price, being twice that of the unpressurized but otherwise similar 680E Aero Commander, is a little steep in relation to the benefits obtained. Only six model 720s were sold in 1959.

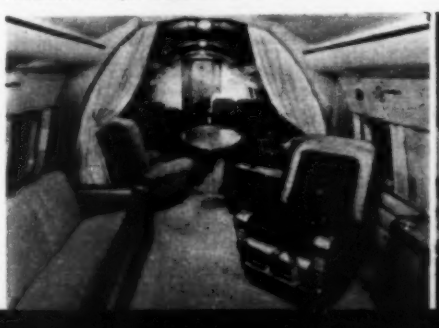
The businessman who wants an aircraft which approaches being a small airliner will find considerable interest in the Beech 65 Queen Air, introduced for the first time in 1960. Although fabricated from major components of the familiar Twin-Bonanza, the Queen Air is for all practical purposes a brand new design. At a price of approximately $120,000 it has a tremendous sales potential, according to Beech, who foresee ultimate sales of close on 1,000 aircraft. Substantial growth potential has been built into the Queen Air, and it would not be surprising if it ultimately became a turboprop-powered aeroplane. Present powerplants of the Model 65 are supercharged Lycoming IGSO-480-A1A6s, which yield 214 m.p.h. and ranges up to 1,500 miles. The future indeed appears bright for this Beech product.

The Light Twins Rounding out the twin-engine field are a variety of interesting and well-selling aeroplanes. The Aero Design company, in addition to its 720 Alti-Cruiser, offers a line of Aero Commanders which range from the Model 500 (at $64,750), the 560E ($78,400), the 680 (at $89,500) to the 680E (at $94,500). Powerplants for the aircraft are the O-540-A1A in the Model 500, the GO-480-G1B6 in the 560E, and the GSO-480-B1A6 in the 680 series and the Alti-Cruiser. The Model 500, introduced only a short while ago instilled new interest in the Aero Commander line and is now the company's best seller. Fifty-eight model 500s were sold in 1959. A total of 148 Commanders of all types were built last year, bringing total sales of this basic type to a number in excess of 800. This is quite a remarkable effort for a company which is competing for sales among the big three (Beech, Cessna and Piper) of the lightplane industry. Of particular appeal to customers has been the Commander's excellent cabin visibility, made possible by the high wing and the clean external configuration. Radar has been installed in many instances, and the Commanders have good all-weather capabilities when so fitted.

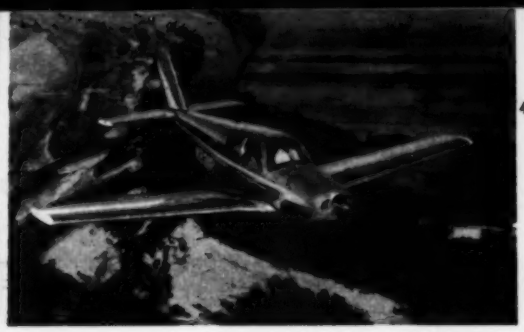
Two models of Beech aircraft are properly listed in the medium-twin class. These are the model H50 Twin Bonanza and the Model B95 Travel Air. The Twin Bonanza (66 of which were built in 1958) is priced at $95,500 and can carry six to seven passengers over 1,000 miles. IGSO-480-A1A6 engines, each rated at 340 h.p. produce 213 m.p.h. cruise speeds. With auxiliary fuel tanks the H50 can achieve ranges up to 1,600 miles. New this year in the Twin Bonanza is a rear stair door, which eliminates the nuisance of climbing over the wing for entry. This feature should greatly

Frederick B. Ayer treatment of a Convair

A Phillips Petro



Beechcraft Bonanza



Beechcraft Debonair

stimulate sales, since one of the main gripes against the Twin Bonanza had been its lack of suitable provisions for entry. Also available from Beech is the D50C Twin Bonanza, similar to the H50 model except that it mounts smaller engines, these being Lycoming GO-480-G2D6 units rated at 295 h.p. Ranges up to 1,650 miles are possible with the D50C, but at speeds of 203 m.p.h. The D50C is priced at $83,000.

Smallest of the twin-engined Beeches is the Model B95 Travel Air, priced at $51,500 for 1960. Seating four to five people, the Travel Air can attain speeds of 195 m.p.h. and ranges of close to 1,400 miles. One hundred and forty-two Travel Airs were turned out last year.

Sure to be a fast seller is the Cessna 310D light twin. With a completely redesigned vertical tail—swept to produce "years ahead flight sweep styling"—the 310D will once again sell for $59,950. Approximately 1,200 Cessna 310s have been turned out by the mid-west firm since the type first appeared in 1954; 160 of them were bought by the Air Force for administrative and light cargo use. Twin 260 h.p. Continental engines are installed to give speeds approaching 240 m.p.h. and ranges up to nearly 1,500 miles. Last year alone, no fewer than 240 Cessna 310s were sold for this class of product—an almost incredible production record of one aeroplane per working day. And Cessna have not the slightest intention of reducing their sales efforts, which last year resulted in a total of some 3,564 aircraft—a figure which does not include 24 L-19s for the Army. The total represents 50.6 per cent of the aggregate lightplane sales among the four major US lightplane producers. Cessna produced 84 more aircraft last year than did the combined forces of the three other leading manufacturers. Total dollar volume of aircraft sales for their fiscal year was $46.6 million—greatest ever in Cessna's history—which represents a 22 per cent gain over the 1958 figure. Cessna have hence led the business and private lightplane industry in both unit and dollar sales for the fifth consecutive year. Said Frank Martin, their marketing manager, in reviewing their past accomplishments, "We will exert every effort to continue holding half of the business and private plane market."

Another entry in the light-twin field is the Piaggio P.166, land-based development of the Italian (in the US, Trecker Aviation) Royal Gull amphibian. Cruise speeds of 185 m.p.h. can be reached by this six-place aircraft, which has twin 340 h.p. Lycoming engines. One doubts, however, whether substantial sales will be made in America; the P.166 is too similar to the established Aero Commander line to tempt buyers to sample this European aircraft. [The P.166 is superior in several respects.—Ed.]

A major contender for light-twin sales will be the Piper Aztec, undoubtedly one of the finest looking aircraft yet produced by the Pennsylvania manufacturer. Intended as a 200 m.p.h. five-place aeroplane, it is powered by two 250 h.p. Lycomings. "No-reserve" ranges of 1,200 miles are possible. At a price of $49,500, the Aztec is considerably cheaper than any other 500 h.p. light twin. The Super Custom Aztec retails for $53,355 and includes much useful electronic navigation equipment. Priced at $54,105 is the "Auto-Flite Aztec," a title which gives away the fact that this version incorporates the Piper-designed, all-transistorized, four pound "AutoControl" automatic flight system. An additional new rear window is installed in the Aztec for improved visibility.

Rounding out the Piper twin-engine line will be the familiar Apache, from which the Aztec was derived. Costing $36,990, the Apache is the most inexpensive light twin in production. Slower and lower-powered than the Aztec, at 163 m.p.h. and 320 h.p., the Apache has a useful range of about two hundred miles less than its more expensive derivative. Apache sales totalled 311 in 1959, and in anticipation of heavy demands for their twins Piper have set production goals of 40 twin-engined aircraft per month this year. They have already described 1959 as their most successful year (sales up 26 per cent from 1958) and are looking forward to a further 40 per cent increase this year. By 1965 they expect annual sales worth $119 million, a figure which they hope will capture for them 45 per cent of the world market.

Single-engined Types This field is almost completely dominated by the big three—Beech, Cessna and Piper. Beech also experienced the best year in their history, with 1959 sales of $37 million. They hope virtually to double sales this year, and two of the aircraft which may help them realize their goal are the well-known Bonanza and the new Model 33 Debonair. This year's Bonanza, known as the M35, is priced at $25,300. With Continental's IO-470-C engine, it can cruise at about 190 m.p.h. over ranges up to 1,000 miles. The most obvious external change is the addition of square wing tips. Bonanza sales reached 480 units last year.

Entirely new this year is the Model 33 Debonair. Almost identical with the Bonanza, except for the inclusion of a conventional tail arrangement instead of the Bonanza's characteristic vee tail, the Debonair is priced at $19,995. Twenty-five early production models were built last year. Beech are hoping, by producing this essentially "economy Bonanza," to recapture some of the customers who have neglected the Bonanza in recent years in order to purchase cheaper Cessnas and Pipers. The least expensive of Beech's seven production models, the newcomer has a 225 h.p. Continental IO-470J engine rated at 250 h.p., is capable of some 140 m.p.h., and retains the Bonanza's 1,000-mile range. Whether the conventional tail will produce a better ride than the proven butterfly tail is the subject of speculation around the airfields.

No fewer than eight basically different single-engined Cessnas are available. Best seller among last year's models, and available again this year, is the two-place Model 150. An incredible total of 648 Model 150s were assembled in 1959. Price of the 150 will be $7,250 in 1960, for which the customer will obtain a 100 h.p. aircraft with 121 h.p.h. cruising. The Trainer version is available for $8,150, while the Commuter model sells for $8,795.

Reintroduced in 1959 after a production lapse of some seven years, the 150 has met with a phenomenal response. In their wildest dreams Cessna can hardly have foreseen the market potential of the aeroplane on which construction had been stopped so many years ago because of what was believed to be a decline in private flying in the US. It instilled new vigour in the low-priced-aircraft market, and now it is likely that other manufacturers will proffer models in the 150's general class. Specifically, Piper are said to be working on a new aircraft (the Papoose?) with which they hope to compete. Cessna 150s have proved particularly appealing to owners of flight schools, who have used them to good advantage to train the executive who would fly his own aircraft.

The Cessna 172A also includes "flight sweep" styling for 1960. Priced at $9,450, the four-place 172A can cruise over 500 miles at speeds of 140 m.p.h. A 145 h.p. engine, the Continental O-300C, is installed. A float-equipped version of this model is also on sale for the first time. No fewer than 874 model 172s were sold last year.

Next most expensive of the Cessnas is the Model 175A at $11,600 and with a 175 h.p. engine providing 147 m.p.h. cruising. The 175A is also fitted with a 35° swept tail. Sales totalled 727

Gulfstream interior by Atlantic Aviation Corp

A representative Fairchild F-27 interior

JetStar, by Dreyfus

Cessna Model 180

Cessna Skylark

Sport and Business

Business Flying in the USA . . .

in 1959. A de luxe version of the 175A, called the Skylark, is priced at $13,050. Cessna claim that the swept tails improve aerodynamic and mass balance, but one suspects that the change was incorporated primarily for sales appeal. Next in price comes the Model 180C, which with the 150 is the only Cessna model which does not offer a swept vertical tail. Since the 180 was first introduced in 1953 approximately 3,600 have been eagerly accepted by the aviation world. The 180C will sell for $14,675, the specification including the 230 h.p. engine giving 160 m.p.h. The 180C is the sole Cessna aircraft to retain a tailwheel. At $14,890 is the Model 182, its 230 h.p. engine yielding 160 m.p.h. and giving a range of about 600 miles. The Skylane, de luxe version of the 182, is priced at $17,345.

Total sales last year for the 180 series were reported as 258 Model 180s and 774 Model 172s and Skylanes. New this year, and completing the Cessna single-engine line, is the Model 210, on sale for $22,450. Powered by a Continental IO-470-E engine, it is unusual in that it is the only production high-wing aeroplane to incorporate retractable landing gear. Cessna are hoping thereby to raise speed to 190 m.p.h. and thus place the 210 in competition with the low-wing single-engine types which have retractable gear (Bonanza, Comanche, etc.). Somehow, retractable gear does not seem quite appropriate to a high-wing configuration and it will be interesting to see what customer reaction will be over a period of time. Cessna, however, must have firm reasons for offering the 210; and they seldom have guessed wrong in the past. Other than the Model 150, which is a two-place aircraft, the Cessna single-engine line are all four-place aircraft.

In the near future the company may offer the Model 407, a four-place turbojet-powered aircraft, for executive use. More than 350 of the jet-powered Cessna T-37s had been procured by the Air Force as trainers, and it was logical for Cessna to consider a civil version, which is precisely what the Model 407 is said to be. Cruise speeds of 465 m.p.h. should be possible with Continental's model 365-9 (civil J-69) engine. An s.f.c. of 1.04 is claimed. Selling price will be about £250,000, and the 407 will be ordered into production only if a military version can be first sold. Beech, however, were not too successful with the French Morane-Saulnier MS-760, and a small jet may not sell too well.

Last of the big three—in alphabetical order only—is Piper. Available in two versions is the Piper Comanche. The pleasingly configured Comanche 180 retails for $15,800, while the Comanche 250 sells at $19,800. Both are four-place aircraft which in turn are offered in four separate versions—Standard, Custom, Super Custom and AutoFlite—to denote various electronic capabilities. The 180 is capable of 160 m.p.h. cruising, a value some 21 m.p.h. slower than the figure quoted for the Comanche 250. Responsible for this difference is the higher power produced by the 250's engine. The 180 has a Lycoming O-360 (at 180 h.p.) while the 250 has a 250 h.p. Lycoming O-540. The Comanche is a particularly attractive aeroplane, and hundreds have been accepted by satisfied customers. In the first six months of 1959 546 were delivered. The Comanche again looks a sure-fire seller for this year. Piper seem to have the ability to make a success out of any aeroplane project they pursue. Perhaps there is much to be said for building the most-inexpensive—but perfectly adequate—product. It is rumoured, by the way, that Piper will soon produce a low-wing four-place aircraft.

Other Piper lightplanes for 1960 are the Tri-pacer, priced between $9,340 ("Standard") and $11,970 ("AutoFlite"), and the Caribbean, an economy version of the former aircraft. Offered in Standard and de luxe versions, the Caribbean will sell for between $8,795 and $9,750 respectively. Piper expect that over 90 per cent of all buyers will specify the higher-priced models this year. Also on sale again is the well-known Super Cub.

Other small lightplanes will be available from Champion Aircraft, Helio and Mooney, but aside from the four-seat Mooney Mark 20 (*Flight*, January 29) these will not make a significant impression on the market. To Mooney's credit, 182 Mark 20 aircraft were sold last year.

Helicopters Still the helicopter does not seem able to make a significant penetration into the business market. Republic Aviation did not have much luck with the Alouette and Djinn. High first costs and appreciable maintenance charges dim the enthusiasm of most users of executive aviation. The helicopter's place in the business world appears confined to applications where the helicopter is simply the only vehicle capable of performing a desired mission. Few operators will choose a helicopter if a fixed-wing aircraft will fulfil their requirements.

Most interesting among the new helicopters is Hughes' two-place Model 269A. If, as projected, the aircraft can be marketed for $22,500, this helicopter may find application in a one-passenger taxi service to and from large metropolitan airports.

Summary A popular US television newscaster generally begins his broadcast with the question, "What kind of day has it been?" At the risk of alienating the reader, one might appropriately begin a summary of this article by querying, "What kind of year was 1959 for America's business aviation?" Sales of aircraft were, as stated earlier, extraordinarily good, but the main news was the great resurgence of private aviation. The introduction of jets stimulated a lot of the interest and convinced a significant number of non-flyers to "go by jet." But an interesting paradox has been brought about by the airlines' public-relations campaigns. The airlines have indeed convinced a new segment of the public to travel by air, and many of these newcomers are businessmen. So convincing have been the airlines' pronouncements that a number of executives have purchased their own aircraft. Hence the airlines have won converts but then quickly lost them.

Will more and more businessmen desert the airlines to become aeroplane owners and as a result reduce load-factors? The answer to this question lies largely with the airlines. If they continue to cause the businessman to suffer lengthy enplaning and deplaning delays, more and more executives will purchase their own aircraft to save what is certainly wasted time.

Another US commentator often writes a "Nobody asked me—*but*" column. Taking a cue from him, and adding a postscript to this article on business aviation, one might offer a suggestion. Five years ago the American automobile industry attained all-time highs in sales of their products. Only a few would have suggested at the time that there was the slightest chance that European-made cars would be capable of realizing substantial sales in America. Yet within three years hundreds of thousands of English, German, French and Italian cars were marketed in direct competition with the US "big three." These cars were purchased because they were relatively inexpensive and of a quality most creditable to the established firms whose names they bore. It is interesting to note that the manufacturers did not compete with America in the field of plushy, chrome-plated products. Today US lightplane sales are at all-time highs, and the American small aeroplane field is dominated by a "big three." An interesting parallel might be drawn. *Can* history repeat itself? Nobody asked me—*but* . . .

Cessna Model 210

Sport and Business

SIX HEADINGS FOR BUSINESS AND AMATEUR FLYING

BY ALASTAIR PUGH

What Course for the Private Pilot?

C. own copyright

In the complex of the UK national airways system, what opportunities are there for amateurs, and what are the possibilities of private flying and air transport coming to terms? This article suggests some ways and means, both for pilots and those who control them

IF British private flying is only now beginning to emerge from the doldrums it is because for ten years it has virtually stood still. Such failure to advance is, in effect, to recede. The steady, sometimes spectacular, progress that has been a feature of the American scene—as recorded on pages 407-412—has passed this country by. France, Italy and even Czechoslovakia have more to offer the private pilot than Britain has in 1960. British flying meetings in the past decade have been less mirrors of progress than pageants of history.

It is not difficult to point to the reasons for the lack of impetus—a preoccupation with commercial and military developments in aviation; disenchantment with the utility value of ill-equipped light aircraft; political barriers on the Continent that have hampered the growth of business flying; a national economy that has restricted investment in the purchase of aircraft; and a political disbelief in the benefit of a plentiful reserve of active pilots. Above all has been the reluctance to accept the fact (so readily apparent across the Atlantic) that private flying is not only a sport but serves a useful commercial function.

With one single exception, until last year no new light aircraft had been available to clubs and private owners for ten years; and when Croydon Airport was closed British private flying reached its lowest ebb. But the battle for Croydon's survival was the private pilot's Dunkirk, and it provided a sorely needed rallying point from the grip of apathy.

New Aircraft The next step forward was the lifting by the Board of Trade last June—under some pressure from the Royal Aero Club—of restrictions on the import into Great Britain of US light aircraft. There is a growing body of opinion which holds that if there is to be a resurgence of off-airways flying in Britain it must depend upon an influx of new aeroplanes. The ready acceptance of US types gives weight to this view, and in the past nine months 45 have been added to the British register. Since January 1959 65 US or European light aircraft have been imported.

But the types that best suit various American needs may not necessarily be the most suitable for our own. The first impact of a modern American light aeroplane and its equipment on a British pilot is considerable; it is tantamount to his US counterpart taking a ten-year glance into the 1970s.

It is too early yet to say which of the US types—or their equipment—on offer now will most nearly prove to suit European conditions; a year or two may have to pass before a pattern is established. Yet there is a really urgent need for one or two types of indigenous design and it may not be an overstatement to say that the expansion of private flying depends upon new British aircraft as much as the manufacturers of these aircraft will depend upon an informed and active home market for sales abroad.

One type—the executive light twin—was suggested as a possibility in a leading article in these pages on February 19. Another design worthy of consideration is an aerobatic two-seater, a type much favoured by British flying clubs and having no real counterpart in the USA. Yet another suggestion is the heavier, faster five- or six-seater carrying airline-type radio and navigational equipment and likely to find favour with firms employing a professional pilot, or for military communications. Gas turbine power—pure jet or turboprop—is not to be overlooked as a light if not particularly cheap or economical way of achieving a performance advantage. But for a good specific fuel consumption a gas turbine must operate at altitude; and if height is a prerequisite the possibility of "flying contact" may be lost.

To make the right choice would require superhuman foresight. But whatever the answer, any one of these types would offer the off-airways pilot opportunities at present denied him. The first step in encouraging private flying is the provision of new tools with which to do the job.

New Flying Aids The next course is almost self-evident. The need for new equipment is almost more urgent than that of new aircraft. Radio for the private pilot is likely to be the absolute minimum requirement for cross-country flying if there is to be orderly development of general aviation. The amateur must expect to discipline himself to terminal control, if not for his own safety then for that of air transport users. Reliable navigation aids are needed equally badly—not only a really good radio compass and ADF but a VHF aid less susceptible to the latter's failings. It must never be forgotten that flying must be made as near-humanly safe as possible for the pilot who flies only the minimum number of hours to keep his licence valid (at present an almost dangerously low five hours in twelve months) as for the instructor or pilot who is in the air almost every day of his working life. VHF omni-range—VOR—has lightness and simplicity to commend it as a private pilot's aid in the present state of the art, but omni-ranges are still relatively few and as yet no suitable British equipment is available.

Of great potential benefit to the off-airways pilot of the 1960s is the work that has been done by the radio sub-committee of the Light Aircraft Committee in drawing up a specification for a private user's radio. Existing equipment is deficient in reliability, in bulk and in weight, and new designs must be given a priority as great as that of new British aircraft. The same applies to radio aids, and a further small and expert sub-committee should be formed to study this pressing problem as well. If any case exists for

Sport and Business

What Course for the Private Pilot? . . .

Government aid for private flying, it could well be that underwriting development costs of radio and navigational equipment against eventual profits on long-term sales could bring the most rewarding return in terms of flying safety.

Another worthwhile line of long-term development would be to explore the practical possibilities of developing a pictorial presentation aid for the light-aircraft owner. No type of navigational assistance holds greater potential for the off-airways pilot, because pictorial presentation is the ideal adjunct to the basic navigational method of contact map-reading.

Benevolent Legislation A third course to be steered is in framing new legislation directed to the benefit of the private pilot. In the private-flying void of the 1940s and 'fifties the amateur pilot found himself increasingly out of step with regulations formed to assist and control his professional counterpart. Although seeking to guide, the massive legislation of *Air Pilot* is out of sympathy with those who need a more simple directive.

The obvious course is to separate, as other authorities have done already, the regulations controlling off-airways flying from those affecting aviation as a whole. If more responsibility is to be demanded of the private pilot his present responsibilities should be clarified. An informed belief is that the attitude of the Ministry of Aviation to private flying (whatever lip-service may be paid to its encouragement) is "not unhelpful." For it to become actively helpful a clear case needs to be argued for a positive form that new legislation could take.

A private pilot's *Air Pilot* is such a course. An excellent precedent is to be found in Australian legislation, where three years ago the Department of Civil Aviation extended just such assistance in the form of a *Private Pilots' Handbook*. Here is a quotation from its enlightened directives:—

"FLIGHT NOTIFICATION: *Be practical in prescribing the method and time by which arrival will be reported.* Inevitably this arrival reporting time is not the same as the destination ETA, in that it is made much later by such time-consuming factors as . . . (a) delays en route, particularly at intermediate stops (b) pegging down aircraft (c) arranging transport to the communication point (d) refuelling arrangements (e) greeting friends and arranging accommodation . . . etc."

Again, in the section outlining the powers of the Australian Air Safety Officer:—

"This officer has the power to demand statements, documents or components and there are severe penalties for non-compliance with such demands. In practice these powers are very rarely used, since in the aviation industry we are all equally concerned with safety in operations, and there is usually a joint effort by all the persons involved . . ."

Now these examples are not in any way intended to slight those who compile *Air Pilot*. The Australian *Handbook* was published in response to a demand (the idea was in fact proposed at a private pilots' symposium, much on the lines of the one held under the ægis of the RAeC in 1957); and although a similar UK publication would have been valuable in the past, the press of a similar British demand has yet to be fully felt.

What subjects should such a simplified manual cover? To answer this question we might draw freely on Australian practice and relate it to our own particular needs. The first precept should be a recognition of the very amateur status of many British private pilots. The man who flies for sport and occasionally on business may well be airborne for fewer than 20 hours a year, and without a compact and simple source of frequent reference cannot be expected to keep *au fait* with the regulations governing his flying.

Apart from the regulatory function of what might be called the *Pilots' Guide*, there is a real need for readily assimilable information on the course of action to follow in conditions of uncertainty—obtaining weather information, the possibilities of diverting to other airfields, procedures to follow to obtain a fix, what to do if lost or in more serious distress, a reminder about aerodrome signals, and so on. The amount of real assistance that can quite simply be obtained is insufficiently appreciated by many who fly, and radio stage-fright is responsible for many of those facilities that are well known being insufficiently used.

It is altogether reasonable to assume in framing a manual for the private pilot that airborne radio will be available with at least a limited number of channels. Acceptance of the need to install VHF radio for anything other than local flying is a necessary expression of the private pilot's willingness to assume a greater degree of responsibility. This implies that our *Pilot's Guide* will embody the information at present included in the useful *Aerad Flight Guide* or *Radio Facilities Charts, United Kingdom* (see *Flight*, January 15, 1960), an MoA publication already extracted from *Air Pilot* and an indication of the course that pressure should be brought upon the Ministry to pursue.

There is also a strong case (at the risk of confusing the issue) for introducing not one new publication but two: a *Pilots' Guide* abbreviation of *Air Pilot* carrying similar legal force for reference on the ground, and a handbook small enough, compact enough and robust enough to become a cockpit companion. Into the latter volume would be included only that information that a pilot requires in the air; a simply phrased *aide-mémoire* extracted from the more detailed information of *Pilots' Guide*.

Here is a ready opportunity for all pilots to suggest to the Ministry the type of manual for which they feel there is a practical need. Essential inclusions, it is tentatively suggested, might be:—

(a) A page devoted to actions in emergency: definition of Distress (Mayday) and Urgency (Pan) states and the *radio phraseology and information to be given* in declaring them.

(b) A page describing what action to take in any state of uncertainty; whom to call and on what frequency, and information as essentially basic as *what to say*. This section should include details of how to obtain weather information, frequencies and times at which regular weather broadcasts are given, how to pass on information about deviations in flight plan and how to obtain a homing or a fix if position is uncertain. Brief details should also be given of how to initiate a controlled descent (QGH let-down) or obtain a GCA.

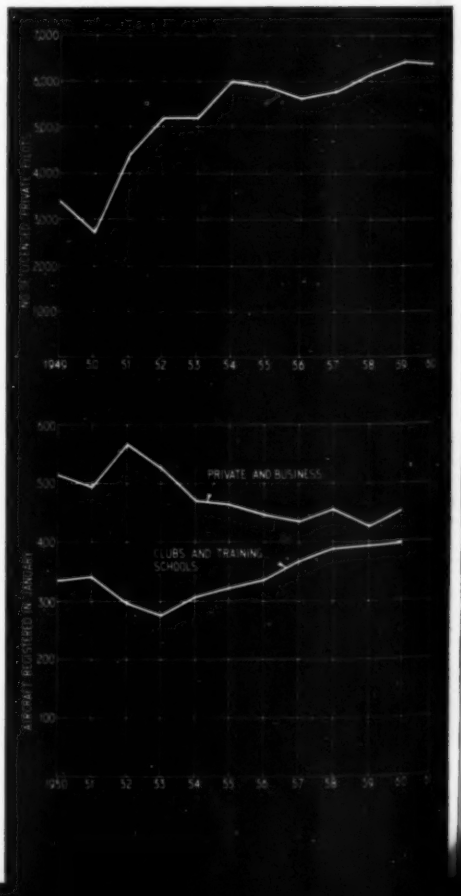
(c) Radio maps and charts. Ideally, radio facilities information should be overprinted on 1:500,000 maps, because of the need for a cross-reference by the off-airways pilot flying contact. Failing this, *Radio Facilities Charts* might be adapted by (1) reducing the prominence given to delineation of the airways' system; (2) including only those aids of interest to the off-airways pilot, i.e., NDBs, VDFs, VORs, broadcast stations and aerodromes with GCA (fan markers, responder beacons, Decca airways, Loran, etc., are not required); and (3) omitting communication coverage charts and paring to the bone all necessary explanations. The list of aerodromes with their radio facilities is one of the most useful features and should be continued, but with a note added to make it clear whether prior permission is required. At the risk of introducing increased complexity, landing fees are also of more than passing interest.

(d) A page giving altimeter setting procedures and explanations as to the implications of QNH, QFE, etc.

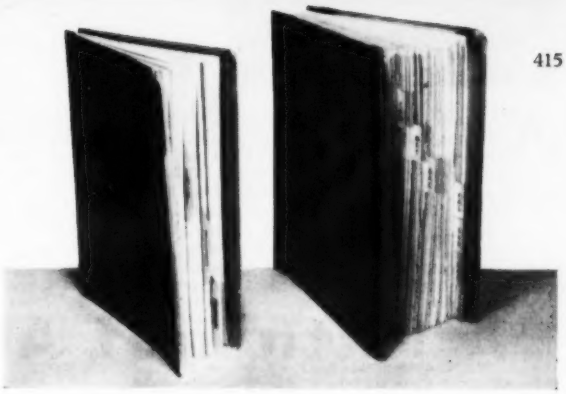
(e) A table of aerodrome, marker, light and pyrotechnic symbols.

To cover these points in a handbook would give amateur private pilots considerably greater confidence that they are complying with the few legal requirements that are really of moment when flying. Most of the rest of the points that concern off-airways flying could well be incorporated into *Pilots' Guide*. But it must be very strongly urged that this publication should not be merely a collection of "relevant extracts from *Air Pilot*"; a much more

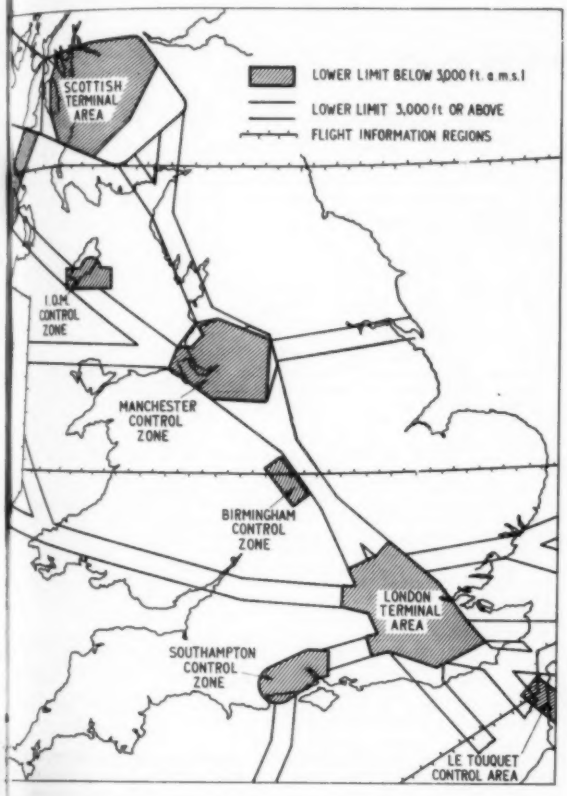
Ten years of British private flying. The number of pilots (top) has increased slowly but the growth rate has recently fallen almost to zero. Numbers of light aircraft registered have remained practically static while their average age has steadily increased



(Right) Comprehensive legislation for the Australian private pilot—including chapters on airworthiness—is contained in the slim volume seen here. Compare its bulk with that of the UK "Air Pilot"



(Below) Restrictions on airspace in the UK are relatively few below 3,000ft, but ways must be found of giving responsible private pilots easier access to the major airfields in control zones in IMC



imaginative approach than this is required. Because they have no aspirations to become professionals, most light-aircraft pilots are extremely critical of the phraseology of *Air Pilot* and may be dangerously impatient in attempting to unravel its complexities. Responsibility should be encouraged by writing in easy, simple-to-read terms the gist of the legislation affecting the off-airways pilot.

There is every reason to suggest that the co-operation that led to the preparation of the highly readable Australian *Handbook* could be repeated by consultation between the Ministry of Aviation and the bodies that represent private flying in this country. They have an excellent reference as a guide and the results of their labours would be of real value. Moreover it would unite their endeavours in a common cause, an aim that on past occasions has appeared to be lacking.

For consideration, the private *Pilot's Guide* might include:—

(a) The information contained in the flight companion, but elaborated where necessary.

(b) Rules of the air and information on airspace restrictions (i.e., control zones and danger areas).

(c) A list of definitions and terms.

(d) A section grouping by weights or types the light aircraft generally available to British pilots and giving for each type or group: length of runway required for take-off; range of hourly fuel consumption; and maximum permissible crosswind components.

(e) Reference to regulations, i.e., to *Air Pilot* and to the Air Navigation Acts and Orders.

(f) Quadrantal cruising heights.

(g) Details of how to go about planning a flight and submitting a flight plan.

(h) Documents required for Customs clearance and procedures to be followed at Customs aerodromes.

And perhaps a good deal of other information as well. But the publication should not be too comprehensive, because of the rapidity with which its information will go out of date and because of the expense of its preparation. Of course, it will be cheaper than *Air Pilot*, for which (with amendments) the present charge to a subscriber is £5 15s a year, and there might be a case for a gratis or very low-cost distribution to every private pilot. There are some 2,800 private pilots in Australia and distribution of the *Handbook* to them is free. While there are more private pilots than this in the United Kingdom—some 6,422 in June 1960—relative to the total population there are many fewer. Australia lies third to the US and Switzerland in the numbers of licensed pilots per million of population (381 compared with 445 for Switzerland and 2,880 for the US), while Britain has only 125 licensed pilots per million people. This is fewer than Chile (163), Sweden (175) and France (228).

The question of amendments raises a tricky issue, because it is quite certain that—faced with a plethora of often trivial amendments—some pilots or owners, somewhere, at some time, are not going to trouble to amend their copies. It is these twin aspects of trivial amendments ("Grass cutting will take place at Blockton Priory airfield between 0915 and 1030hr on alternate Mondays until subsequent notice") and their random flow that tend to bring the otherwise admirable amendments system into contempt. A solution is for the Ministry to issue a clear directive that minor amendments, and those concerning changes of a strictly temporary nature and not affecting air safety, should simply not be published. All others should be issued together on predetermined dates, say on quarter-days. Wherever possible, the changes to which the amendment sheets apply (such as alterations of radio frequency) should be introduced at the same time as the published amendments.

Freedom of the Air The fifth course to be steered by the private pilot is that towards greater freedom of the airspace. Perhaps this is a contradiction in terms, because more freedom of movement cannot reasonably be expected without more positive control. And the private pilot must expect to demonstrate greater responsibility and self-discipline before he can reasonably ask to spread his wings into controlled airspace when the visibility is below VMC.

Obviously control zones restrictions are not imposed because of the difficulty of navigation at lower visibility levels, but because of the impossibility below the VMC limit of maintaining see-and-be-seen between aircraft under airways control and those operating in a more random manner. In any case see-and-be-seen is a dated concept, and one which must eventually give way to more complete control of all users of the airspace.

But why does the private pilot want greater access to control zones in the United Kingdom? The answer lies in the need to make business flying a practical proposition on the many days in the year when visibility in the zones is less than the stipulated five miles of VMC. And control zones cover every aerodrome in the more populous areas of the country. No problem exists for the pilot who is equipped to fly airways and who has an instrument rating (something has recently been done to ease the expense and difficulties of obtaining one) but the fact remains that few non-professional pilots could either qualify for an instrument rating or keep sufficiently in practice to maintain it.

If United States experience is reflected here, the spearhead of private-flying growth in this country is likely to come from a nucleus of private owners who use their aeroplanes—as they do their cars—for business and occasionally for pleasure. Few will fly more than 100 hours a year, and many only 20 or 30. Yet it is these pilots who stand to benefit the most from access to aerodromes in control zones, not only from a commercial point of view but because these airfields can do much to safeguard their safety. Caught out in deteriorating weather now, the private pilot must scoot for shelter as best he can, probably along a railway line and then home by familiar landmarks. This time-honoured but hopelessly outdated method of navigation is both inefficient and dangerous compared with the easy homing and secure let-down that can be given by a properly equipped aerodrome. No private pilot really wants to land at London Airport, but access to Gatwick, to Eastleigh, Manchester, Birmingham, Glasgow and so on is a primary need if general aviation is not to be stifled.

How is this to be accomplished? One obvious way is to extend

(*Concluded on page 418*)

ARE we on the threshold—as it seemed in 1925 when the title slogan was coined (but with no question-mark)—of a great resurgence of private flying? *Flight* has invited the Ministry of Aviation, the Royal Aero Club, the Association of British Aero Clubs and Centres and the Air League of the British Empire to file policy flight-plans for British light aviation. To each we submitted eleven identical questions framed to determine the course that off-airways flying might follow. Where omissions occur in the replies it is because the particular question was inappropriate to the Ministry of Aviation or other body concerned.

"A Nation of Airmen"?

IDEAS IN THE MELTING POT

What are your views on the equipment now available to British private pilots?

The Ministry of Aviation (reply by Geoffrey Rippon, MP, Parliamentary Secretary): I agree that light aircraft of UK design, and their installed equipment, do not generally compare favourably with the best modern designs. However, in the changed conditions of the industry we hope that plans for the development of a light aircraft will emerge which will do us credit. To this end the Standing Joint Committee on Private and Club Flying and Gliding has almost completed a specification for a new British light aircraft.

The Royal Aero Club (reply by M. O. Imray, aviation secretary): Since the Government eased the restrictions on the import of dollar goods and included aircraft in the list, there has been a very adequate variety of types from which the private and business pilot can choose. Whilst we would like to see a reasonable range of British-manufactured aircraft, there can be no doubt that the importation and operation of foreign light aircraft (especially from the USA), will give new life to general aviation and may in the long run encourage British manufacturers to enter a home market which is beginning to develop once again.

Association of British Aero Clubs and Centres (reply by G. H. M. Miles, chairman): Since the restrictions on the importation of aircraft from the dollar area were lifted, modern aircraft have become available to private pilots in this country; but what the ABAC is gravely concerned about is the lack of a modern basic club aircraft on which pilots can be trained to ABAC standards at low cost.

Air League of the British Empire (reply by Air Cdre G. J. C. Paul, secretary-general): Except for imported aircraft the average age of those on the British register is now about 20 years. This speaks for itself.

Do you accept that radio is a prerequisite to the development of private flying?

Mr Rippon

Mr Rippon: Assuming that "radio" means two-way voice communication with ground stations, it is a prerequisite not only for the development of private flying but also for its continued existence. For purely local flying—for the sake of getting some fresh air on the aerodrome circuit—it is not absolutely essential, but it is certainly desirable that all pilots should be communication-minded from the start of their early training. In addition, the number of aerodromes where radio is necessary even for local flying is likely to continue to increase.

Mr Imray: Radio is not at present an essential—one may move fairly freely without it; but we consider that it is a "must" if the general aviation movement is to develop.

Mr Miles: Not only do I accept this, but since 1945 I have been pressing, in season and out of season, as strongly as I am able for suitable radio equipment for light aircraft.

Air Cdre Paul: Yes, but it must be simple.

Have you clear views about the type of navigation aid that should be developed and used by the private pilot?

Mr Rippon: VOR beacons are becoming increasingly available and clearly they will provide the standard aid for many years to come. This should satisfy private-flying needs, and light-weight equipments (10lb or so) are available on the American market and could be over here if the demand were sufficient. The instrumentation is relatively straightforward and simple; and in the case of private pilots wishing to go in for instrument flying, equipment can easily be added to give ILS facilities, using a common presentation. Charts can be cheap, simple and used indefinitely and in some cases VOR can be used as a navaid without any charts at all. Voice broadcasts of weather and other information can be superimposed on selected VOR stations.

VDF, where available, could be used mainly as an emergency aid. ADF will continue to be of use for a very long time, even though the number of NDBs may be reduced. A light-weight Decca receiver, if developed, would prove of considerable use over much of Europe.

Mr Imray: This is a difficult question to answer. Ask any six pilots and you will probably get six different answers. It does seem probable that, with the way things are developing, VOR may prove the most useful and accurate of the ADF aids. However, development is rapid in this field and the next few years may well produce new and better equipment.

Mr Miles: In the long term the ideal must be that "a poor man's version" of the equipment available to the airline pilot should be available to the private pilot. I think it would be wise to reserve any expression of opinion regarding the specific type of navigational aid which should be developed immediately until we know more about the results of the very considerable development in the United States.

Air Cdre Paul: As a minimum this should be VHF radio which will provide GCA, homings, position fixings, and so on. More expensive aeroplanes will merit more comprehensive, light-weight equipment to match the purpose for which they are intended. Actual equipment is at present governed by that which is provided for commercial users.

What are your views on the Standing Joint Committee on Private and Club Flying and Gliding on which you are represented? What can be said about the work of the Committee?

Mr Rippon: The committee has already helped to secure certain concessions for private flying and gliding, e.g., use by clubs of RAF airfields on the Air Ministry disposal list, the relaxation of import restrictions on light aircraft, and the modification of certain requirements of the ARB affecting club aircraft. It has produced a specification for inexpensive VHF aircraft radio equipment, and is engaged in drawing up a specification of the requirements for a light aircraft for training and touring. The committee should continue to play a valuable part in keeping the Minister advised of the problems of club and private fliers.

Mr Imray: The Standing Joint Committee was formed in October 1958 "to assist the Minister of Transport and Civil Aviation in keeping under review all matters affecting the development of private and club flying and gliding in the United Kingdom." It did useful work during the following six months, which culminated in the submission of the first over-all review to the then Minister of Transport and Civil Aviation.

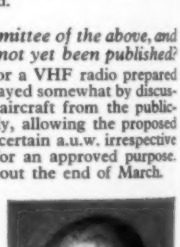
Since that time we have had a General Election, a new Ministry and a new Minister, but so far we have had no indication as to whether or not the proposals made in the first review will be accepted or rejected, nor has a meeting of the committee been called since. Until such time, therefore, as we can obtain some statement of Government policy in relation to general aviation, the past and future efforts of the committee may well be nullified. Both the aircraft industry and commercial aviation have received the detailed attention of the Government, and policy statements have been made. It seems only reasonable that policy in respect of general aviation should be made clear without further delay.

Mr Miles: I am quite certain that considerable benefit will be derived from this committee, but as its members have been asked to treat its proceedings as confidential until a report of its work is published, I regret that I am unable to comment further.

Air Cdre Paul: The Air League, although it would be glad to be represented on the committee, has not been invited.

What of the work of the Radio Sub-Committee of the above, and why has the specification for a VHF radio not yet been published?

Mr Rippon: Publication of the specification for a VHF radio prepared for the Standing Joint Committee has been delayed somewhat by discussions about the possibility of removing club aircraft from the public-transport C of A classification or, alternatively, allowing the proposed VHF equipment to be used in aircraft below a certain a.u.w. irrespective of C of A classification, provided it is used for an approved purpose. It is hoped to publish the specification by about the end of March.



Mr Imray

Mr. Imray: The Radio Sub-Committee held its first meeting in January 1959 and has met on six occasions, the last being in September 1959, and a full report of its deliberations has been sent to the main committee. Whilst it is not possible to comment in detail as the Ministry consider that all minutes and papers for these meetings are classified as confidential, it is possible to say that much useful investigation ranging from frequency-allocations to the provision of suitable radio equipment has been carried out. A draft specification and requirements for VHF communications equipment for use in light aircraft has also been submitted to the main committee, who have not yet met to discuss it. Naturally, it is no use producing a specification if it is not published. It is to be hoped that the Standing Joint Committee will therefore authorize its release, after approval, in the very near future; we shall certainly press for this course of action.

Mr Miles: No comment, for the reason stated above.

Are you satisfied with existing legislation as it affects the private pilot? If not, what steps do you recommend should be taken?

Mr Imray: As is well known, the Air Navigation Order 1954, which was not satisfactory, has been the subject of revision for the past few years and the latest draft of the new Air Navigation Order 1960 has just been received and is being studied. In the earlier stages, the Royal Aero Club made vigorous representations, especially in respect of the scale of fines imposed for technical offences and for a general simplification of the legislation. We feel that much of the original confusion in the old Air Navigation Order will be removed and that pilots should be able to form a clearer picture of their responsibilities in the future.

Mr Miles: By and large, there is very little wrong with the existing legislation. My main criticism concerns the manner of its presentation. I would like to see all the rules and regulations written in plain English, and so arranged as to provide easier reference. The Air Navigation Order and Air Navigation Regulations are now being re-drafted by the Ministry, and the ABAC has recommended a number of easements and points of clarification which we would like to see incorporated.

Air Cdre Paul: Our dissatisfaction is not so much with existing legislation but with the lack of any government policy for light aviation. The Ministry of Aviation should include a department devoted to studying and *encouraging* light aviation.

What are you doing at present to encourage the growth of private flying in Great Britain? What steps are now under consideration by committees or sub-committees that you have appointed?

Mr Imray: The key to the growth of general aviation in Great Britain is that a Government policy of encouragement should replace the negative one of the past years. From this all things can flow—more and better aerodrome facilities are among the first priorities. The closing of Croydon and the threatened abandonment of Eastleigh and Blackbushe by the MoA are examples of this negative policy. The fact that London, the greatest city in the world and the centre of half the population of Great Britain, is now without a Customs airfield available to all sections of general aviation, is completely unacceptable. Naturally the Standing Joint Committee has stressed the need for a policy of active encouragement and we shall take all possible opportunities of actively campaigning for it. In addition, the RAeC has taken active steps in encouraging the import of suitable aircraft, in the lamentable absence of a home industry, and is doing all it can to encourage both business and private operators to equip with modern aircraft.

Mr Miles

Mr. Miles: In 1946 we decided on a policy and laid down a programme of work aimed at securing an increase in the number of flying clubs, in the volume of club flying, and in the number of owners of private aircraft which the wider facilities of the clubs would bring into being. The number of our clubs, groups and air centres has risen from 35 in 1946 to 125 today, and the membership of our clubs from 8,700 at its lowest in 1950 to over 15,000 today. Flying hours have risen from 37,000 at their lowest in 1950 to over 96,000 today. We have not yet completed the programme that we set ourselves in 1946, and we are still working in accordance with the policy we evolved at that time.

Air Cdre Paul: Two steps. A sub-committee of the Air League Council on light aviation has been set up in the UK to make a report and recommendations. The Robert Perfect scholarship will this year be used to train six pilots; this is a small step, but one in the right direction. Various monetary grants have also been made to encourage club flying and gliding.

What are your views on giving the private pilot greater freedom of airspace? Can a case be made for allowing radio-equipped light aircraft access to major airfields in control zones in IMC? Is there a need, for example, for a private pilot's limited Instrument Rating?

Mr Rippon: The private pilot should have the greatest possible freedom of airspace that is compatible with the safety of air traffic in general. The major "restriction" on private pilots is, of course, the requirement that an aircraft must be properly equipped and its pilots properly qualified (by holding an Instrument Rating) before it enters controlled airspace in IMC. In practice, this restriction is thought to be serious only in relation to control zones, since there is free airspace beneath airways which preserves reasonable flexibility of routes for private pilots without ratings.

In control zones, some form of entry/exit procedure allows flight to or from aerodromes normally used by light aircraft in weather conditions well below the VMC limits, without the need for the pilot to hold an instrument rating.

Any aircraft, if it is properly equipped, and the pilot properly qualified and instrument rated, has access to major aerodromes in control zones in IMC, unless the aerodrome, for traffic reasons, is restricted to certain classes of traffic, as applies in the case of London Airport. The standard set for the instrument rating is related to the need to ensure not only the safety of the aircraft being flown but also its efficient operation in accordance with ATC clearances so that it will not conflict with other traffic. In these circumstances the acceptance of more than one basic standard of competence would seem illogical. Moreover, the difference between the requirements of a "limited" and a full instrument rating could never be very great, and the kind of procedure that would permit the use of any "limited" rating might be practicable at only a very few aerodromes. The gain in freedom and flexibility of operation resulting from the possession of a full rating seems likely to be more than worth the small extra effort (compared with any "limited" rating) involved in obtaining it.

Mr Imray: A case for greater freedom can always be made, but greater responsibilities and higher standards of airmanship must go with such freedom. Air-miss statistics definitely indicate that the private pilot is not causing a problem. Three-dimensionally the air is a vast and sparsely populated space, in spite of what other interests would have the general public believe. As a responsible body the RAeC must agree that safety for the transport of passengers by commercial carriers is of vital importance. We are not prepared to admit that the rights to the use of airspace which we demand will in any way affect the general safety of all air users and we feel that a sense of proportion in these matters must be preserved. Some interests are claiming that the ideal is to control all movements in all airspace and at all times. We would dispute this most strongly as being merely a pretext for either putting the problem aside or attempting to obtain a monopoly of all airspace. In fact, we feel that a good case can be made for much of the control of airspace below 1,500ft to be free save within the immediate vicinity of large airports.

A case can certainly be made for allowing radio-equipped aircraft access to many major airfields in control zones. This is both desirable and possible in the case of such airfields as Gatwick, Eastleigh, Jersey and Manchester. The ideal answer, of course, is that general aviation should have its own aerodromes with adequate facilities in those control zones where the major airports have heavy commercial traffic. As an immediate aim, we must ensure that every general-aviation aerodrome situated within controlled airspace has Special VFR access by means of free lanes in IMC. We can see no valid reason why London Airport cannot be made available to all aircraft which carry the appropriate radio and navigation aids.

A private pilots' instrument rating is in fact now available as a result of negotiations between the MoA and the RAeC. We do not believe, in the interest of safety of all concerned, that there should be any lowering of flying standards for such a rating.

Mr Miles: Naturally I am all in favour of giving the private pilot the greatest freedom of airspace that the demands of air safety permit. It is part of our task jealously to safeguard the freedom of the air for our clubs and their members. But a collision between a light aircraft and a larger passenger machine, in the vicinity of a major airfield, would cause such an outcry for further restrictions to be placed on private flying that I would not think it prudent to permit access of light aircraft to major airfields in IMC, until such time as these aircraft can be equipped with the radio aids equivalent, for practical purposes, to those available to airline aircraft; and subject to their pilots holding an appropriate Instrument Rating.

I am, however, by no means certain that there is not a case for considering whether the definition of IMC could not be broadened in respect of certain areas, for aircraft equipped with navigational aids of a certain standard.

Air Cdre Paul

Air Cdre Paul: This is clearly a very important question; but, in our view, before a satisfactory answer can be given a vast improvement is necessary in ground facilities, including radio. The sub-committee referred to in a previous answer is studying this kind of question and will make recommendations.

What can the private pilot do to help himself? And what flying can a club-trained pilot look forward to after obtaining his Private Pilot's Licence?

Mr. Imray: The private pilot must realize and accept his responsibility to the movement and to the general public and attune himself mentally to this responsibility at all times when in the air. To this end he should aim to improve his airmanship by keeping up to date on the regulations and should remember that one irresponsible action can often bring the whole of the private flying movement into disrepute. Officials have a habit of remembering a bad action and ignoring the negative evidence of the hundreds of flights which are carried out correctly.

Regarding the amount of flying that a club-trained pilot can look forward to after obtaining a Private Pilot's Licence, this surely depends on how much money he can spend on his flying and if this is small what aircraft are available to him from the club fleet. If his purse is deep he can become a private owner and fly according to his means or inclination. If he is unable to do this he faces a problem as many clubs are reluctant to allow their limited number of aircraft to be used as touring vehicles when they can be more lucratively employed on local flying training. It depends on the policy of the club—is its function to train pilots to PPL standard and no further or is it prepared to provide aircraft for touring and giving pilots a chance to practise their art and improve their standard? There are welcome signs that some clubs are now catering for the needs of their PPL members.

Mr Miles: I would think the short answer is "not enough." Two years ago we produced the ABAC advanced diploma courses to standardize advanced training, and to encourage club members to improve their flying techniques. We have an affiliation with the Fédération Aéronautique de l'Union Française whereby members of ABAC clubs are temporary honorary members of the French flying clubs, and this should assist to encourage air touring by club aircraft. A year ago we offered prizes to club members for the three best answers to the question "What should be done to make the flying club, group and air centre movement more interesting and of greater benefit to members?" Some very interesting suggestions were made, but although details of the competition were widely circulated only 12 club members were sufficiently interested to compete. However, these are still matters with which we are very much concerned.

Air Cdre Paul: Before long it may be practical to regard a light aeroplane in the same way as people now regard a motor car and to use it accordingly—that is, both for business purposes and for pleasure.

Is there a case to be made for Government financial assistance to give impetus to the renewed enthusiasm for private flying particularly now that the Kemsley Trust loans are drawing to an end?

Mr. Rippon: The movement already receives Government financial assistance as follows: (1) a petrol duty rebate (equivalent to 1s 9d a

"A Nation of Airmen"?...

gallon) to flying and gliding clubs and groups; (b) free landing at a large number of State aerodromes for club aircraft; (c) landing at a nominal annual charge for private aircraft; (d) housing and parking of private aircraft at a reduced charge. Many of the larger flying clubs also benefit from Air Ministry contracts for the training of ATC cadets up to PPL standard.

The Government already have under examination the possibility of a scheme to replace the Kemsley Trust, as suggested recently by Mr Philip Wills.

Mr Imray: Definitely yes. The Kemsley Flying Trust was a brilliant success and achieved a fantastic amount on a very small capital of £100,000. The RAeC and other responsible organizations are already making the case with the Government for a National Flying Trust.

Mr Miles: It has never been the policy of this Association to ask for Government subsidy. We have preferred to seek indirect assistance, and promote schemes such as the ATC Scholarship scheme in which value for money is obtained by the Government for a specific service rendered. But we do now urge that the Government should underwrite an order for a new aircraft which could be purchased by the clubs on easy terms at a nominal rate of interest, and this also applies to radio equipment.

I believe that the most vital matter upon which Government intervention is needed is in connection with the provision of aerodromes. The reduction in the number of licensed civil aerodromes since the war is frightening; and unless, by at least the earmarking of sites, provision is not made very quickly for a number of aerodromes adequate for the future needs of this country in the years ahead, private flying will be hamstrung for ever. We can import aeroplanes, but we cannot import aerodromes.

The primary requirement, however, is a declaration of Government policy—that it is in the national interest to support and encourage private flying.

Air Cdre Paul: It is the Air League's view that there should be a Government fund to replace the Kemsley Trust. Also, we should like to see the tax on aviation fuel abolished.

Do you think it is desirable that private flying should speak with one voice? If so, whose?

Mr Rippon: So far as the Minister is concerned one of the chief objectives in setting up the Standing Joint Committee on Private and Club Flying and Gliding was to provide a forum where representatives of the organizations directly concerned, the RAeC, the ABAC, the PFA and the BGA, would reach a co-ordinated view on matters affecting the future of flying and gliding. I intend to call a further meeting of the committee shortly.

Mr. Imray: Yes, that of the RAeC, which can and does through its membership and affiliations represent the whole of general aviation.

Mr Miles: I am all for liberty of speech and hold that, within the limits of decency, anybody should be permitted to say what he likes about anything he pleases. But the ABAC speaks for the ABAC. It neither requires nor permits anyone else to speak for it; it does not desire to speak for anyone else; and the ABAC represents a larger section of the private flying community than any other UK organization.

Air Cdre Paul: Yes, it is particularly important to everyone who has the interests of aviation at heart that they should be represented at the highest level by a single organization speaking with a single voice. It is not without interest that as long ago as May 8, 1909, *Flight* published a report in which the spheres of operation of the "Aeronautical Society," "The Aero Club" and "The Aerial League" were defined. It was proposed that these three bodies should separately devote themselves to the furtherance of (1) scientific investigation, (2) sport, and (3) "the influence of public opinion . . . from the point of view of national defence," and it was suggested that the three should come to a definite written agreement recognizing their respective spheres of action.

WHAT COURSE FOR THE PRIVATE PILOT? (continued from page 415)

the free lane and "special VFR clearance" system that already permits limited access to aerodromes within zones. But the relatively hazardous "contact-IMC" navigation that this entails is no longer good enough, and it must be supplemented by a limited degree of control (a) to phase-in light-aircraft traffic with scheduled movements and (b) to ensure greater safety and proper let-down and exit of aircraft using the free lane.

Perhaps the most difficult part of this operation for the pilot has been establishing the pin-point that marks the lane entry. So consideration should be given to automatic CRDF (radar direction-finding) fixing when clearance is requested, followed by directions for a course to fly and transmission of a series of QDMs (magnetic course to steer to reach the transmitter) until these coincide with the free-lane centreline. An airfield VOR would make the process almost automatic; and, after the preliminary CRDF precautionary fix, homing would merely be a matter of selecting a predetermined radial. As an interim step, visual working of free lanes with an inbound and outbound pattern of sodium lights would assist accurate homing and departure.

It is a valid criticism of these ideas that they bring light-aircraft radio calls into contact with those of professional pilots. Not only is there a likelihood of congestion on a common frequency, but self-consciousness at a lack of R/T fluency before a supposedly critical audience may be a source of acute embarrassment to an amateur pilot. It cannot be said too strongly that this is not an imaginary problem; its existence has led many an amateur into postponing, or not making at all, a perfectly routine R/T call for assistance that would only too readily be given.

Because of the nature of the assistance and control required by the private pilot it has been suggested that the French system should be adopted of a discreet private pilots' or "club" frequency —a country-wide network of VHF stations that would be used to increase the safety and regularity of off-airways flying. Some of the more enlightened club airfields (Elstree is one) have seen fit to install radio in the belief that radio control is an essential to the development of flying with small aeroplanes. But such equipment is expensive and aerodromes with the foresight—and finance —to set up such installations are few.

Surely here is an outstanding case for Governmental support of what has been called "the third leg of the aviation stool." While business flying is still on too small a scale to have much overall effect, one way or another, on the national economy, there is an understandable reluctance for the Government to subsidize *flying* from the public purse. But the case for ground support is different, has ample air-commerce precedent, and could be justified on grounds of safety alone. Apart from this, it would be the most valuable possible investment and incentive to the development of private flying.

More Responsibility If aid is to be provided for the private pilot, if he is to be given assistance, sympathetic legislation and encouragement, what is to be expected of him in return? First, a greater standard of responsibility; an acceptance of control for its benefit to his own safety and to that of other users of the airspace. Secondly, a progressively higher standard of skill—in his flying, in the use of radio and the mastery of navigation aids. Thirdly, he must be prepared to accept an exchange of greater freedom under control for a demonstration of his proven ability. It might be made obligatory for a pilot using free lanes into major airfields in IMC to be in possession of a limited private pilot's instrument rating—a certificate of his competence to use instruments as a supplementary aid. We might call the proficiency certificate an "IMC-contact rating" and award it after five hours instrument "actual" and five hours in a link trainer. Its purpose would be to ensure the greater safety of the pilot who can see the ground below, but who has no horizon or lateral reference. It would in fact be comparable to the 180-degree rating studied in the US, the purpose of which is to enable a pilot who becomes engulfed in cloud safely to turn around and fly into the clear again.

Contact Airways Finally, the sixth course to fly entails keeping in sight the private pilot's primary aid to navigation—sight of the country over which he flies. Contact flying will be with us for many years to come. But the face of the countryside is changing as motorways spread across the land. They are straight, they are broad and they will cover quite long distances. And they are going to be used as track lines by private pilots. We must make use of them by establishing private pilots' airways along their length, and setting up beacons to mark their entry and exit points. A new spirit walks abroad among commercial aviation's junior partner; new flexibility of thought is required to exploit it while we can.

THE SIX HEADINGS—A SUMMARY

● **New Aircraft** The resurgence of enthusiasm—for which the introduction of foreign aircraft has been responsible—indicates that private flying will develop rapidly as British designs become available. A fast light twin is probably the most suitable first type.

● **New Equipment** An efficient VHF radio and an effective navigation aid are essential adjuncts to new aircraft.

● **Benevolent Legislation** Urgently needed is legislation directly applicable to the needs of the pilot who flies off-airways. It should take the form of a simplified, specially written *Air Pilot* and a handbook to carry in the aircraft. Amendments must be reduced and issued at fixed intervals.

● **Freedom of the Air** The private pilot requires limited access to aerodromes in control zones. The air traffic problems of arranging this must be solved, either piecemeal or in general. There is a case for Government assistance in furnishing the necessary aids.

● **More Responsibility** The "fly anywhere, any time" attitude adopted by some private pilots is not compatible with the modern need for positive control. This must be accepted, and amateur pilots must acquire the skill required to receive assistance and control from those on the ground and to avoid endangering other aircraft in the air.

● **Contact Airways** Where obvious track landmarks exist, contact flying should be made safer by identifying them and regulating the traffic along them.

Sport and Business

Flying Clubs and Groups in the United Kingdom

The frustrations of training, the pride of first solo, the fun of sporting flying and the wide horizons of air touring are all a part of the life of the units here listed. They belong to the Association of British Aero Clubs and Centres, and to the Popular Flying Association (not included are firms' clubs and overseas clubs).

ABAC MEMBER CLUBS

Airways Aero Club, *Biggin Hill, Kent*
Bristol & Wessex Aeroplane Club, *Bristol*
Cambridge Aero Club, *Cambridge*
Cheltenham Aero Club, *Christchurch, Hants*
Coventry Aeroplane Club, *Baginton, Coventry*
Denham Flying Club, *Denham, Bucks*
Elstree Flying Club, *Elstree, Herts*
Exeter Aero Club, *Exeter*
Fair Oaks Aero Club, *Fair Oaks, Surrey*
Hampshire Aeroplane Club, *Eastleigh, Southampton*
Herts & Essex Aero Club, *Stapleford Tawney, Essex*
Isle of Wight Air Centre and Flying Club, *Sandown, IoW*
Lancashire Aero Club, *Barton, Manchester*
Leeds/Bradford Air Centre, *Yeadon, Yorks*
Leicestershire Aero Club, *Leicester East*
London Transport (C.R.S.) Sports Association Flying Club, *Fair Oaks, Surrey*
Luton Flying Club, *Luton, Beds*
Midland Aero Club, *Elmdon, Birmingham*
Newcastle-upon-Tyne Municipal Flying School and Air Centre, *Woolsington, Newcastle*
Norfolk and Norwich Aero Club, *Swanton Morley, Norfolk*
Northamptonshire Aero Club, *Sywell, Northampton*
North Devon Aero Club, *Chivenor, Devon*
Oxford Aeroplane Club, *Kidlington, Oxford*
Plymouth Aero Club, *Roborough, Plymouth*
Portsmouth Aero Club, *Portsmouth*
Rochester Flying Club, *Rochester, Kent*
Royal Artillery Aero Club (Middle Wallop), *Christchurch, Hants*
Scottish Aero Club, *Perth*
Skegness Aero Club, *Ingoldmells, Skegness*
Southend-on-Sea Municipal Air Centre and Flying School, *Southend, Essex*
Southern Aero Club, *Shoreham, Sussex*
Surrey and Kent Flying Club, *Biggin Hill, Kent*
Ulster Flying Club, *Newtownards, Co Down*
West London Aero Club, *White Waltham, Berks.*
Wiltshire Flying Club, *Thruxton, Hants*
Wolverhampton Aero Club, *Wolverhampton, Staffs*

ABAC ASSOCIATE MEMBER CLUBS

Air Touring Club, *Biggin Hill, Kent*
Allied Flying Group, *Woolsington, Newcastle-upon-Tyne*
Alouette Flying Club, *Biggin Hill, Kent*
Alpha Mike Flying Group, *Thruxton, Hants*
A.P.T. Flying Club, *Sandown, IoW*
Auster Flying Club, *Rearsby, Leicester*
Avon Flying Group, *Seend (private), Wilts*
Bircher Flying Group, *Wolverhampton*
Blackpool and Fylde Aero Club, *Blackpool*
Central Flying School Flying Club, *Little Rissington, Glos*
Channel Islands Aero Club, *St Peters, Jersey*
Cotswold Aero Club, *Staverton, Gloucester*
Cumberland Flying Club, *Silloth, Cumberland*
Defford Aero Club, *Defford, Worcs*
de Havilland (Chester) Flying Club, *Hawarden, Cheshire*
Derby Air Centre, *Derby*
Derby Airways Flying Group, *Derby*
Douglas Holland Flying Group, *Elmdon, Birmingham*
East Anglian Flying Club, *Ipswich, Suffolk*
East Yorkshire Aero Club, *Hedon, Yorks*
Easy King Flying Group, *Sywell, Northants*
Edinburgh Flying Club, *Turnhouse, Edinburgh*
Experimental Flying Group, *Biggin Hill, Kent*
Fairey Flying Club, *White Waltham, Berks*
Grimsby Flying Club, *Waltham, Lincs*
Highfield Flying Group, *Wolverhampton*
High Wycombe Flying Group, *Booker, Berks*
Horizon Flying Club, *Biggin Hill, Kent*
Horizon Flying Group, *Biggin Hill, Kent*
Hornet Moth Flying Group, *Denham, Bucks*
Household Brigade Flying Club, *White Waltham, Berks*
Isle of Man Flying Club, *Ronaldsway, IoM*
Magister Flying Group, *Denham, Bucks*
Middlesex Flying Group, *Elstree, Herts*
Northern School of Aviation Flying Club, *Blackpool*
North Waltham Flying Group, *Thruxton, Hants*
North West Flying Group, *Limavady, N. Ireland*
Panda Flying Group, *Luton, Beds*
Propellers Flying Group, *Hatfield, Herts*
Puss Moth Flying Group, *Biggin Hill, Kent*
RAF Watton Flying Club, *Watton, Norfolk*
RAF Wethersfield Aero Club, *Wethersfield, Essex*
RAF Flying Club Cranwell, *Cranwell North, Lincs*
Reading Flying Club, *Woodley, Berks*
Ringway Aero Club, *Ringway, Manchester*
Rhoose Flying Club, *Rhoose, Glam*
St Edward's Group, *Kidlington, Oxford*
Severn Lamb Flying Group, *Edgehill, Oxon*
Shropshire Flying Group, *Sleap, Salop*
Southdown Flying Group, *Wellcross Grange Fields, Sussex*
Spartan Flying Group, *Denham, Bucks*
Stoke-on-Trent Flying Club, *Meir, Staffs*
Swansea and District Flying School and Club, *Swansea*
Thirty-Two Group, *Wolverhampton*
Tiger Club, *Redhill, Surrey*
Turnhouse Air Centre, *Turnhouse, Edinburgh*
Upper Heyford Chapter SAC Aero Club, *Upper Heyford, Oxon*
Vendair Flying Club, *Biggin Hill, Kent*
Warwickshire Aero Club, *Elmdon, Birmingham*
Wrexham and Deeside Flying Club, *Wrexham, Denbighshire*
Yam-Sing Flying Group, *Little Rissington, Glos*

PFA CO-OWNERSHIP GROUPS AND CLUBS

Cardiff Ultra-Light Aeroplane Club, *Rhoose, Glam*
Montgomeryshire Ultra-Light Flying Club, *Heldre Hill, Welshpool*
Cambridge Private Flying Group, *Cambridge*
Armstrong Siddeley Flying Club, *Baginton, Coventry*
Biggin Hill Flying Club, *Biggin Hill, Kent*
Warwickshire Flying Club, *Elmdon, Birmingham*
47 Sqn Flying Group, *RAF Abingdon, Berks*
MPM Flying Group, *Elstree, Herts*
TK Flying Group, *Hatfield, Herts*
Biggleswade Flying Group, *Panshanger, Herts*
Rutherglen Group, *Rutherglen (private), Glasgow*
North Middlesex Flying Group, *Elstree, Herts*
Carnegie Flying Group, *Panshanger, Herts*
Albatross Flying Group, *Denham, Bucks*
Stapleford Flying Group, *Stapleford Tawney, Essex*
Warwickshire Aero Club, *Elmdon, Birmingham*
Swallow Flying Group, *Elstree, Herts*
Roberts Eagle Flying Group, *Elstree, Herts*
East London Flying Group, *Stapleford Tawney, Essex*
Old Warden Flying Group, *Biggleswade, Beds*
Herriard Flying Group, *Lasham, Hants*
Sir Armstrong Whitworth Flying Group, *Coventry*
Southport Aero Club, *Hesketh Park, Lancs*
North Norfolk Flying Group, *Norfolk (private field)*
Aldenham Private Flying Group, *Elstree, Herts*
Skyways Flying Group, *Stansted, Essex*
Lincoln Aero Club, *Bardney, Lincs*
Birmingham Airport Flying Group, *Elmdon, Birmingham*
Sherwood Flying Club, *Tollerton, Nottingham*
Cornish Private Flying Group, *Perranporth, Cornwall*
RAF Syerston Flying Club, *Syerston, Notts*
Hertfordshire Police Flying Club, *Panshanger, Herts*
Central Flying School Flying Club, *Little Rissington, Glos*
Chaddersley Flying Group, *Wolverhampton*
PFA Group 94, *White Waltham, Berks*
Silverline Flying Group, *Southampton*
Glamorgan Flying Club, *Rhoose, Glam*
PFA Group 100, *White Waltham, Berks*
Rhyl Flying Group, *Rhyl (private field), Flints*
Daedalus Flying Group, *Lasham, Hants*
Fox Easy Flying Group, *Lasham, Hants*
604 Sqn Flying Group, *North Weald, Essex*
Mill Hill Group, *Elstree, Herts*
Bustard Flying Club, *RAF Boscombe Down and Old Sarum*
Airscooters Flying Group, *White Waltham, Berks*
LCW Group, *Elstree, Herts*
Ulster Aeroplane Group, *Sydenham, Belfast*
Walter-Watson Group, *Stapleford Tawney, Essex*
Fakenham Flying Group, *Little Snoring, Norfolk*
Great Easton Flying Group, *Stansted, Essex*
Denham PFA Group, *Denham, Bucks*
Air Touring Group, *Luton, Beds*
Belfast Airport Flying Group, *Nutts Corner, Belfast*
Sky Group PFA, *Lasham, Hants*
600 (City of London) Sqn Flying Club, *Biggin Hill, Kent*
Yorkshire Territorial Flying Group, *Yeadon, Yorks*
Blackpool & Fylde Aero Group, *Squires Gate, Blackpool*
Westbourne Flying Group, *Elstree, Herts*
The Tiger Club, *Redhill, Surrey*
615 Sqn Flying Group, *Biggin Hill, Kent*
Butterfield Flying Group, *Stapleford Tawney, Essex*
Bolton Flying Group, *Barton, Manchester*
Humber Flying Group, *Skegness*
Rollason Flying Group, *Biggin Hill, Kent*
Hornet Private Flying Group, *Luton, Beds*
Hadrian Group, *Woolsington, Newcastle-upon-Tyne*
Winkfield Flying Group, *White Waltham, Berks*
Yorkshire Flying Group, *Sherburn-in-Elmet, Yorks*
KK PFA Group, *White Waltham, Berks*
GEC (Coventry) Flying Group, *Baginton, Coventry*
Forester Flying Group, *Panshanger, Herts*
Prestwick Aero Club, *Prestwick, Scotland*
Aeronca Flying Group, *Stapleford Tawney, Essex*
Bournemouth Flying Group, *Christchurch, Hants*
Streatham Flying Group, *Denham, Bucks*
Royal Engineers Flying Group, *Rochester, Kent*
Thruxton Flying Group, *Thruxton, Hants*
West Lancs Flying Group, *Speke, Liverpool*
Valley Flying Group, *Rhoose, Glam*
Welwyn Flying Group, *Panshanger, Herts*
Jedburgh Group, *Kelso (private field), Scotland*
Perseus Flying Group, *White Waltham, Berks*
Frewin Flying Group, *Stapleford Tawney, Essex*
Marwood Flying Group, *Barton, Manchester*
RAF Waddington Popular Flying Group, *Waddington, Lincs*
Coningsby Group, *Coningsby, Lincs*
Brooklands Flying Group, *Barton and Ringway, Manchester*
Southwell Air Touring Club, *Nottingham (private field)*
PFA Group 172, *Thruxton, Old Sarum, and Redhill*
Tipsy Flying Group, *Newtownards, N. Ireland*
FK Flying Group, *Stapleford Tawney, Essex*
Manchester Flying Club, *Ringway, Manchester*

Straight and Level

HOW much aviation reading do you do? Huge sales of Thinx Electronics' BEDSTEAD reading simulators* have done much to keep the industry up-to-date with its reading. But at the same time there appears to be a growing demand for *human* reading simulators — those junior executives whose job is to mark up periodicals so that Very Busy Top People can write letters to editors beginning "My attention has been drawn to . . ."

These junior executives—attention-drawers I call them—have a very important job to do. But how do they know what the head man ought to read? When they write "See pages 24 and 132" on the circulation list, do they assume, as I suspect, that the head man is interested mainly in articles about his own company? Do they not realize (let's say) that a particular bit of news from Brazil, which so far as they know is unrelated to their company's affairs, could lead to a £2m contract? How can they know?

So the attention-drawers mark, in general, articles that mirror their own firm's affairs, rather than articles that open a window on the world. It comes to this: do Very Busy Top People regard reading as a mirror, or as a window? If they regard it, rightly, as a window, should they not dispense with their attention-drawers and get down to some solid reading themselves?

Note to attention-drawers: Mark this one up. He won't dispense with you.

** Busy Executives' Device for Sifting Through Endless Aviation Documents.*

● "I repeat only what I have said before on air development and the State corporations. If they lose money, what does it matter?"—*Gp Capt C. A. B. Wilcock, MP (Lab., Derby North), chairman of the independent airline Derby Aviation.*

● I have just seen some figures which show that the highest-paid British airline captain gets less than the lowest-paid American airline captain. The salaries are, respectively, £387 a month compared with £400 a month. The same applies to co-pilots: the highest paid British co-pilot gets less than the lowest-paid American co-pilot.

What about the *highest*-paid American captain? He gets more than £1,000 a month. That's folding money, boy.

Good gracious, what am I trying to do—start a strike? [Source: International Federation of Air Line Pilots Associations, figures converted from $s to £s on my slipstick.]

● Talking about captains' salaries, a reader says that BEA's new tail insignia resembles the 40 m.p.h. road speed restriction signs. For 40 read 400 m.p.h., 40 seats, or 40 free drinks—or even the captain's salary to the nearest thousand.

● Do you remember that Straight and Level announced a competition just over a year ago (February 6, 1959) for the best sculpture symbolizing "material diversion"—a subject which, I said, "lends itself well to abstract art forms." My office is now full of entries.

As most of you will know, the expansion of British air transport has been restrained not so much by the requirement that new air services must not cause "material diversion" from established operators, but by the utter abstraction of these two words. Where is the independent organization capable of scientifically assessing what constitutes material diversion in any particular argument about a new service? There isn't one, nor does the proposed new legislation appear to make provision for one.

"Friendship Bulletin's" latest front cover†

The phrase brings foam to the mouths of many people, yet it is embalmed in the new draft legislation. Lord Douglas, making BEA's first comment on it, fastens on the phrase—but not, as one might expect from a progressive airline like BEA, to implore that someone be appointed to give meaning to it. Instead, the corporation wants more importance than ever to be attached to the concept of material diversion. This is like saying that more importance should be attached to B,)'35?9.?34-5. What on earth does it *mean?*

†A member of the Sheik of Kuwait's bodyguard stands beside the Shah of Persia's Fokker Friendship. Did I say friendship?

● One for Roger's Thesaurus:—

"Broad brush treatment"—We don't know, or we can't be bothered with, the details.

● Have you noticed how rarely you read in the newspapers these days stories about bomb hoaxes? This column once suggested (August 29, 1958) that the way to stop bomb hoaxes was for newspapers to agree not to publish stories about them, "to remove the satisfaction which hoaxers derive from reading about the consequences of their actions, and to prevent the idea from getting around among other would-be hoaxers."

I hear that the newspapers last year decided to suppress bomb hoax news in the interests of air transport.

This must be one of the very few news topics which newspapers have agreed should be censored, and everyone in the business should be greatly obliged to them.

● "On the mainland the helicopters will operate from half a 2.5 hectare (six acre) area adjacent to Penzance station."—*Guess which aviation monthly.*

● British troops of the Special Air Service Regiment, after exercises in Germany, were flown home by the Luftwaffe. *The Daily Telegraph* reported:—

"The West German military attaché in London sought permission for the Luftwaffe to bring them home 'as a gesture of friendship.' Permission was given and Transport Command were informed that RAF planes would not be required." The *Daily Express* reported a British officer as saying:—

"When we asked Transport Command to bring us home they said they were too busy flying troops and equipment to North Africa."

● Did you know that a British independent airline is now operating 707s between Bermuda and New York? It's true, or at any rate half true: the aircraft are Viscount 707s operated by Eagle Airways Bermuda.

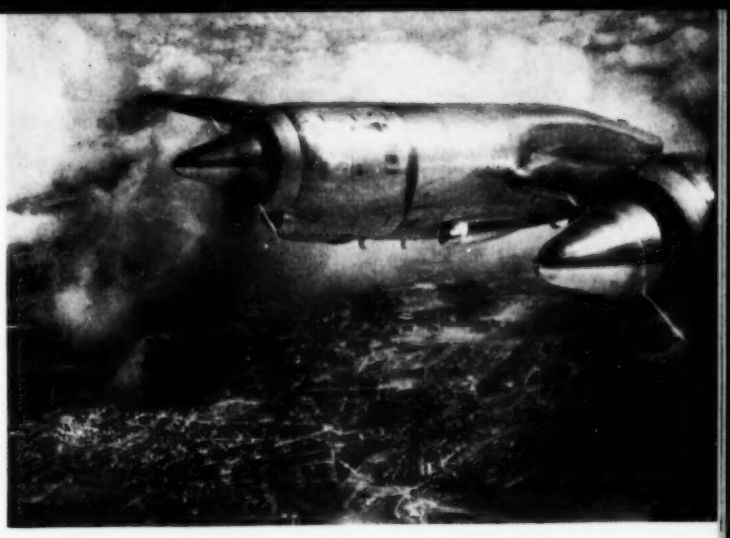
Here's an advertising gimmick for them: How big can they get the numerals 707, and how tiny the word Viscount?

● "In this case [the fitting of vortex generators to the Convair 880s] vortex generators are a significant aerodynamic improvement. When someone else uses them they are a crutch, of course."—Phil Prophett, Convair assistant chief engineer in charge of flight test, as quoted by *Airlift.*

● News agency message as received:

"The order makes it compulsory for an airlines pilot to retire when he reached his 60th birth."

ROGER BACON



Last Monday the fifth production Vanguard broke off for a week from route-proving flights with BEA (it is seen here on one of these over Madrid) for a visit to Trinidad, where it will be demonstrated to BWIA. Various US airlines were to have had a chance to see it when it called at New York on the way

AIR COMMERCE

IATA SORTS IT OUT

KEYNOTE of the eleventh-hour IATA traffic conference in Paris (February 24-March 16) is said by IATA to be the decision "to introduce lower fares in the low-fare class of service in many parts of the world." With the one possible exception of the Europe - Caribbean route, however, the fare reductions are not substantial all-the-year-round cuts. There are no material reductions in the basic North Atlantic fares, and cuts in basic tourist fares to the Far East and Africa are at the most 10 per cent —which is some way off the minimum 15 per cent generally assumed in any definition of economy class.

But substantial cuts are to be introduced in the form of promotional fares, i.e., those that are limited in validity or as to season (or both). Promotionals are perhaps the most important things to have emerged from the recent IATA fares battles: the keynote of Honolulu (at which, it will be recalled, only limited agreement was reached last October) was likewise the introduction of substantial cuts in Europe in the form of promotional fares. (These were analysed in the context of BEA in *Flight* for October 23.)

The other important principle to emerge from the Paris meeting was a *quality* differential between jets and propellers. On the North Atlantic the year-old fare differential remains; but on other routes concessions are made to propeller aircraft to enable them to offer more leg-room and so on, in order that they can remain in business in competition with the jets.

These principles having been established, it is appropriate to examine the agreements in more detail, and to consider their implications for BOAC.

North Atlantic. The new fare structure, valid from July 1, may be compared with the existing structure in the following table:—

London - New York One-way Fares

Today			From July 1	
Jets				
£185 14s	($520)	DL	—	—
£164 6s	($460)	F	£178 11s	($500) F
£119 13s	($335)	T	—	—
£97 3s	($272)	E	£96 9s	($270) E
			£62 10s	($175) SP*
—	—			
Propellers				
£178 11s	($500)	DL	£178 11s	($500) DL
£157 3s	($440)	F	£157 3s	($440) F
£114 6s	($320)	T	—	—
£91 16s	($257)	E	£89 6s	($250) E†
			£57 3s	($160) SP*
—	—			

DL=de luxe (abolished); F=first-class; T=tourist class (abolished); E=economy; SP=special promotional. * Theoretical one-way fare only: double this to get new 17-day winter-only excursion. † £85 14s ($240) in winter.

The most important decision here is the abolition of tourist class, a major concession by BOAC. Though the term *de luxe* (i.e., first class with a sleeper seat) is abolished, there still remains a three-tier fare structure—four-tier if the spectacular new 17-day excursion is included.

The table shows that it will now cost the passenger £14 5s ($40) more to fly first-class by jet to New York. However, it will cost no more than it does now to fly first-class in a propeller aircraft. The airlines agreed not to offer sleeper seats on jets; those passengers who want to fly the Atlantic fully reclined with their feet up can now do so in a propeller aircraft for the same fare as the briefer "upright" ride by jet. Berths are abolished completely from all types of aircraft.

Economy-class jet fares remain the same, near enough; *propeller* economy-class fares are slightly reduced in the summer and knocked down a bit more in the winter.

The year-old jet surcharge (five per cent approx.) has been built into the new jet fares. Thus the jet *v.* propeller differential remains: whether it can in all conscience be termed "a propeller discount" is arguable. But the retention of the differential (which, measured as a discount, is 12 per cent first-class and 7½-11 per cent economy-class) is a triumph for reason and commonsense.

Most important is a very-low-fare winter excursion which will be available from October 1 until March 31. Valid for 17 days, it will cost $350 (jet) and $320 (propeller)—a differential of about 8½ per cent. This is a major reduction, bringing the air fare lower than the lowest sea fare for the first time ever, though only in winter. It is equivalent to a passenger-mile rate of about fourpence, compared with about sixpence for economy-class.

Europe - Caribbean. The same sort of first-class jet/propeller pattern is to be applied, but from October 1 rather than July 1. Also to be introduced from October 1 is the one genuine all-the-year-round new economy fare to emerge from the Paris meeting: tourist class will, as on the North Atlantic, be abolished and replaced by economy-class fares of "up to 16 per cent" less. Whether "up to 16 per cent" is comparable with the "10-20 per cent" reductions which the Minister has approved BOAC to introduce on cabotage routes to the British West Indies remains uncertain. The corporation could not say at *Flight*'s press time what the new economy fares to the Caribbean will actually be.

Europe - Far East. Those who expected fare cuts of 10-20 per cent to Hong Kong and Singapore, as approved by the Minister for BOAC, will be disappointed to see that the Europe - Far East reductions agreed in IATA are only 6-10 per cent below tourist from October 1. Though this hardly produces a genuine economy fare, the tourist service will be renamed accordingly. There is to be a new inclusive-tour fare to the Indian sub-continent (available for package-tour parties of six or more tourists at 22 per cent below today's lowest fare). But the basic-fare reductions are only half those implied in BOAC's cabotage threat, and the devaluation of the word economy is to be regretted.

There will be no jet *v.* propeller fare differential on this Far East route, but propeller aircraft will be allowed to offer an inch or two more leg-room. First-class fares go up a "small" amount.

It is evident that the 6-10 per cent reductions do not apply to the Europe - Australia fare, but only to that portion of it as far as the Far East. BOAC declined to give more information on this point at our press time, and they were unable to offer examples of the 6-10 per cent fare cuts to points in the Far East. It seems that the new "Tigeroo" pool partnership of BOAC, Qantas and Air India, though the trio spoke at the meeting with a united voice, did not achieve the fare cuts that had been expected.

Europe - Africa. First-class fares go up; and tourist fares come down "in general by up to 10 per cent." However, the main achievement by BOAC and their SAA partners are 90-day excursion fares, 16 per cent below tourist fares between Europe and the Union of South Africa. No mention is made of any such cuts, promotional or otherwise, on the British cabotage routes terminating in Nairobi and Salisbury.

No jet *v.* turboprop fare differential is applicable, but a quality differential in favour of the propeller is permitted.

* * *

Now that IATA have at last reached agreement on the 1960-61 fare structure, and avoided the dreaded open rate war by a narrower margin than ever before (it was narrow enough in Paris in February last year), the following three vexed questions call for a quick answer:—

(1) Will the Minister, having approved BOAC's proposal to introduce economy fares 10-20 per cent below normal fares on British cabotage routes, now approve the new low fares agreed by IATA on the relevant routes—namely, those to Africa, the Far East and the Caribbean?

(2) Is it still Government policy that "moves on the cabotage front cannot be ruled out if we fail to get material reductions through IATA"? Does the Minister consider that the reductions now recommended by IATA are "material"? If so, does he now "rule out moves on the cabotage front" which he has approved?

(3) It is being said that the independents' VLF applications (from Eagle and Airwork/Hunting Clan) have been "bought off" by offers from the Minister to these companies, and also to Skyways, of a share in the two corporations' low-fare markets. Is this correct?

As *Flight* went to press these questions could not be answered by the Ministry. BOAC said that the IATA agreement "now makes it possible to process the cabotage fares." Whether the word "process" is intended to mean "implement" or "withdraw" is anyone's guess.

J. M. R.

Three more Boeing 707s are to be bought by Qantas in addition to the seven already delivered, one of which is seen here making its regular call at London Airport. The three additional aircraft will be 707-120Bs with P & W JT3D turbofans, which will be retrospectively fitted to the first seven aircraft "Flight" photograph

AIR COMMERCE . . .

NORTHWEST ELECTRA ACCIDENT

THERE were no survivors among the 56 passengers and six crew who were aboard the Northwest Airlines' Electra which crashed near the Ohio River hills in Southern Indiana on March 17. This accident brings the number of passengers killed in major accidents this year to 321.

The aircraft was on a flight from Minneapolis to Miami, and it was thought at first that it had collided with "a military jet." But no evidence of another aircraft was found and it was surmised that a wing and two engines which fell three to five miles from the main wreckage had given rise to this report.

The Electra had called at Chicago, and shortly after news of the accident was made public an anonymous telephone call, reporting that a bomb had been placed in an aircraft at that city, gained wide publicity.

A previous instance of disintegration in mid-air occurred in September last year to a Braniff Electra, with the loss of 23 passengers and six crew. No report has so far been published but a technical investigation was held this month.

UNDER-CHANNEL CAR FERRY

NEW facts and new ideas on the Channel tunnel were dug out and turned over in a paper read recently to the Institute of Transport by M. A. Cameron, Principal Officer (Administration), British Transport Commission. Investigations made by the Channel Tunnel Study Group, he said, had shown that physical prospects were "definitely favourable" and economic prospects "reasonable"—at long last a tunnel looked like coming into existence. A newspaper report on Monday referred to a project cost of £100m and an opening date of 1966, and said that the Cabinet would discuss the tunnel this week.

The intention is to construct two main rail tunnels each of 21ft 4in diameter with a central 12ft service tunnel. At first, said Mr Cameron, car-carrying electric trains would consist of single-deck vehicles but later they would have double-decks and carry up to 300 cars. Peak capacity might be 1,700 cars per hour with a portal-to-portal train time of 45min and an average speed of about 60 m.p.h. The tunnel would be pay-as-you-go; a toll would be charged on entry of the train into the tunnel and thereafter passengers would remain in their cars throughout the journey. Maximum capacity would theoretically be 216 trains daily in each direction; traffic forecasts supplied by the study units indicated that 90 trains a day would cope with the traffic in 1980.

The present investigation into the tunnel's possibilities is the first major one since 1930 and has had to be conducted in the face of growing air competition to surface transport. But this aspect Mr Cameron seemed to brush aside. "A non-stop hourly service between London and Paris," he said, "with comfortable trains and good catering, doing the journey in 4hr 20min would hold its own against any competition, even helicopters." [Even hovercraft?—Ed.] Air transport, he said, had made little impression on freight because cost per ton was so much above surface rates. Aeroplanes carried motor cars at the most in half-dozens; trains could carry them quite fast in hundreds.

BEA's CHAIRMAN AND THE BILL

LORD DOUGLAS has reserved comment on the new Bill until publication of the current issue of the *BEA Magazine*. This is what, in part, he now says:—

"The Bill sets out the terms of reference for the new Board and one paragraph is particularly important because it refers to the question of 'material diversion of traffic' from existing services. The wording proposed makes material diversion of traffic from an established operator only one of the matters which the Board should 'consider.'

"Some of the speeches during the debate in the House reflected anxiety that this would not give sufficient protection to the corporations' operations nor to the millions of pounds of public money invested in them. Mr George Strauss, MP, speaking for the Opposition, said he would prefer to see this section redrafted as a direction to the Licensing Board against giving licences which would result in material diversion of traffic from an established operator. Such a change would certainly strengthen BEA's position."

The chairman goes on to stress that there should be no limitation of frequency on any BEA route, since this could have "most serious economic consequences." He warns the proposed licensing board that "it would be disastrous if division of effort were allowed to weaken the British position against foreign competition." He guesses that the bill, "in substantially its present form," will become law by the middle of the year. (Mr Sandys is reported to have said that he hopes that it will become law by Whitsun.

Footnote: Another point made by Lord Douglas last week was that total BEA capacity in the summer of 1962 will be 60 per cent more than the 1959 summer figure. Nearly two-thirds will be provided by Comets and Vanguards. He predicts that the 1959-60 year (due to end on March 31) will produce a profit "greater than in any previous year." However—here comes the chairman's customary warning when prophesying profits—"we must still, as always, look most carefully for ways of keeping down expenditure [which] is going to be abnormally high because of the cost of introducing two new types of aircraft, the Vanguard and Comet. In addition, BEA's revenue rate will fall as a result of the new low fares."

Left, a Qantas Boeing 707 is re-fuelled by Shell from a hydrant at Avalon, Victoria. A Zwicky Tagus dispenser is used to deliver up to 600 gal/min through two Goodyear 2½in diameter hoses. Right, a Westruk 1088 Mk 2 ground power unit, designed to MoA specification, is on trial at Dublin Airport and is being used to start the Rolls-Royce Dart engines of Aer Lingus Viscounts and Friendships. The equipment consists of a 12-phase selenium rectifier providing 28V at 500A and 30V at 2,000A (for engine starting) rectified AC suitable for any aircraft having a 28V d.c. system

The nose of the first production D.H.121, which is due to fly in December 1961, is seen here taking shape at Hatfield. Six more 121s will join the flight-test programme during 1962, and deliveries to BEA are expected to begin in June 1963. Given the orders, a production rate of six aircraft per month should follow

EAST EUROPEAN "AIR UNION"

THE airline conference recently held in Warsaw may prove to be as historic as any that preceded the formation of Air Union. In the fortnight between March 8 and March 23, the airlines of six nations—East Germany, Czechoslovakia, Hungary, Bulgaria, Rumania and Poland—met to discuss airline co-operation on operational planning, financial and technical levels. In the slightly stilted language of the Polish announcement, the main items on the agenda are to be: "Development of co-operation in the field of commerce and technology; the introduction of a standardized system of planning; measures directed towards the lowering of operating costs; and the renovation [renewal] of equipment."

Also to be discussed are final details of a specification prepared jointly by the "six-pool" union for a new aircraft which might be used by each airline; this might be the short-haul jet VVB BB.155 referred to on page 296 of *Flight* for March 4, or one of its derivatives.

The six national airlines discussing the six-pool union are: Deutsche Lufthansa (East Germany); CSA (Czechoslovakia); Malev (Hungary); Tabso (Bulgaria); Tarom (Rumania); and LOT (Poland). CSA now operate four Tu-104As and have six Il-18s delivered or on order, and the latter type has also recently been acquired by LOT, who are to operate BB.152s in 1962. Malev, Tabso and Tarom are Il-14 operators, while DLH operate Il-14s and are said to have ordered the BB.152.

PLANS FOR A MIDLAND AIRPORT

SHORTLY after the British Chambers of Commerce had propounded their arguments for the development of a basic national network of British airports, comes news of a scheme by five Midland local authorities to develop Castle Donington.

Following a meeting the Nottingham City Council, Notts County Council, Derbyshire County Council, Derby Town Council and Leicester County Council have decided to employ a technical consultant to prepare a report on the conversion of Castle Donington airfield in Leicestershire into a major civil airport for Nottingham, Derbyshire and Leicestershire. The cost of a comprehensive survey is to be £2,500 and this will be shared among the five authorities. The airfield at present is disused and is adjacent to the site of the famous Donington racing circuit that was used before the war. As a matter of policy, Derby Town Council have agreed that the airfield should be developed with a hard runway at least 5,000ft long and provided that at least one other local authority agrees to the scheme Derby have agreed to set aside the product of 1½d rate—about £12,000 a year—towards the project. There is scope for extension of at least one runway to some 9,000 or 10,000ft.

SOFTLY AT LOS ANGELES

EARLY next month stringent anti-noise rules are to be introduced by the FAA at Los Angeles International airport. They will apply to all aircraft, civil and military, and can be taken as precursors of the FAA's intentions at other major US airports. Restrictions are placed on approaches to the airfield, glide-slopes and take-off directions; but no limitation has been imposed on jet use of Los Angeles during sleeping hours because of scheduling problems "impossible of solution" and because it "could lead to an adverse effect on air commerce."

The basis of the new rules—Special Civil Air Regulation No 438—is the establishment of an airport traffic-pattern extending 2,000ft above a radius five miles from the centre of the airport. Aircraft *en route* are prohibited from entering this zone, but any that have made two-way radio contact or have prior permission can land or take off.

Aircraft above 12,500lb certificated take-off weight must enter the traffic pattern at not less than 1,500ft and maintain that height "as long as practicable." As a descent from 1,500ft at the boundary of the area to the geographic centre of the airfield represents a descent-path inclined at over three degrees, the FAA have proposed that jets should maintain an altitude at or above the glide-path until reaching the middle marker on an ILS approach. The same ruling is applied to large piston-engined types.

Aircraft of under 12,500lb are less restricted: they are required to enter the area between 1,000ft and 1,200ft and maintain 800ft-1,000ft "for as long as practical" before landing, though these rules go by the board if altitudes must be changed to maintain VFR.

For take-off the rules are that, in general, aircraft taking off in any direction must climb straight ahead to 1,500ft as rapidly as possible. Pilots of large fixed-wing aircraft *must* take off to the west over the shore line if the wind is less than 5kt from any direction; otherwise they must submit a written report to the FAA explaining their failure to do so.

The Agency hopes that the Los Angeles rules will serve as a model for other airports, notably Idlewild and Washington, and a general rule is being drafted to standardize the Los Angeles type of traffic pattern. But what is applicable to Los Angeles may not suit New York; as recorded in a recent note (*Flight*, February 12, 1960) the FAA's "down-wind" take-off proposals for New York were ill received by the chairman of the Senate Aviation Sub-Committee and the FAA were subsequently obliged to back down.

COMPLICATED AND INTRICATE

"A HIGHLY complicated, intricate case" was the comment of the Chancellor of the Exchequer on BOAC's guaranteeing of MEA's order for four Comets 4Cs (*Flight* last week). Mr. Amory was being pressed in the House on March 15 by George Strauss (Lab, Vauxhall) to comment on Sheikh Najib Alamuddin's accusation that there had been an inordinate delay by the Treasury in approving the arrangement.

Mr Amory explained: "It was not a straightforward case of credit insurance . . . I looked into the circumstances and I am satisfied that there was no avoidable delay."

Sir Arthur Harvey (Con, Macclesfield), for the third time in the House in recent weeks, asked on what terms the corporations were lending millions of public money to foreign operators [see "Comets for Mr Onassis" last week]. Mr Amory asked Sir Arthur to put this question to the Minister of Aviation.

But not only is MEA's Comet 4 order now secure, with the good prospect of more Arab airline orders to follow; the MEA-BOAC partnership is no longer in jeopardy. The Sheikh has quoted BOAC's estimate that MEA's Comet operations will bring £1¼m in feeder revenues to the corporation. MEA are planning a service to Iberia to connect with BOAC's Comet services to South America, "where," says the Sheikh, "MEA have big communities travelling regularly to and from the Middle East." His airline also planned connections with BOAC's African services at Benghazi and Tripoli, connections with West Africa at Tripoli, and with South Africa at Benghazi. Again, MEA planned three services a week between Beirut and Frankfurt: BOAC already had four, so there would be a daily service in partnership with BOAC on this important route. There would also be Comet services out to Daharan, where there was a big US oil community, and to London where there would be connections with BOAC across the North Atlantic.

DOES VLF GO BY THE BOARD?

IT is now possible to speculate on the significance of a remark made by Harold Bamberg, chairman of Eagle Aviation, in his recent *Flight* interview with Frank Beswick. He said: "The original VLF pattern goes by the board with the new Bill."

The initials VLF signify the Very Low Fares, applications for which have been the subject of controversy since they were first announced by Eagle (and subsequently by Airwork and Hunting-Clan) more than a year ago. No further elucidation of this surprising remark by Mr Bamberg is forthcoming from him.

Meanwhile, it is reasonable to ask whether the Ministry has offered to the independents a share of the corporations' low fare markets on British cabotage routes. It is, indeed, being said by

An historic event—Armstrong Whitworth's first order for the Argosy (see note opposite)—is portrayed in the picture on the right. H. M. Woodhams, chairman and managing director, presents a model to the customer, Capt R. G. Gibson, general manager of Trans Arabia Airways. At left is B. P. Hough, AWA's sales manager. The other picture shows one of Trans Arabia's two DC-4s, which is registered G-APTT in the name of Sheikh Duaij Al Saman Al Sabah. The Kuwaiti airline has recently acquired two DC-6s

AIR COMMERCE...

non-partisan observers of the UK air transport scene that VLF has been "bought off" by the Minister. If this is so, for what price has it been bought? Were Airwork and Hunting-Clan encouraged to merge by the offer of a share in BOAC's low-fare market in Africa? Have Eagle been similarly offered a share of the Atlantic route? (see "Cunard and British Eagle"). Have Skyways and Hunting-Clan been offered a share of BEA's low-fare services to Malta, Cyprus and Gibraltar? These questions last week appeared to be sufficiently pointed for the parties concerned, including the Ministry, to reply: "No comment" (see page 421).

"RECESSION" AT BARBADOS

ORIGINALLY estimated to last a fortnight or less, the Anglo-American talks at Barbados which began on February 24 did not end until March 17—over three weeks later. Even then the meeting, which was to review the Bermuda Agreement, was —to use the official word—"recessed." The talks will be resumed in London in a few weeks' time.

It appears that agreement has been reached in respect of only one of the areas which are the subject of conflict between the airlines of the two countries—the Caribbean. Thus the other differences, in particular Northwest's claims to rights in Hong Kong, remain unresolved.

The background to the Barbados talks was discussed in *Flight* on February 26. It now remains to be seen whether, during this breather, the delegates will feel—as they did not feel when the meeting began—that the *principles* of the Bermuda agreement rather than the route schedules annexed to it are in need of revision.

The statement reads, in part, as follows:—

"Civil aviation discussions between the UK and the US which began in Barbados on February 24 are being recessed to be resumed in London in a few weeks' time. Full opportunity was taken of the presence of delegates in Barbados for a comprehensive review of route schedules to the [Bermuda Agreement] in so far as the Caribbean area is concerned. Subject to a few outstanding points which require further study heads of delegations agreed to recommend to their governments expanded route schedules for this area.

"As regards other areas both delegations indicated that the exchange of views during the past few weeks had been highly beneficial and expected that resumed negotiations will lead to a mutually advantageous expansion of routes.

"The consultation recessed today was one of the series of meetings between representatives of the two Governments since the agreement was concluded February 1946. The last meeting was held three years ago. Since that time both sides have wished to discuss a number of questions arising from air services over routes in the agreement."

COLOMBIAN C-46 ACCIDENT

A SECOND air transport tragedy (see page 422) occurred last week when a Colombian C-46 belonging to Sociedad Aeronautica Medellin SA crashed near Medellin, Colombia, on March 20. The aircraft was attempting to make a forced landing in a swamp after failure of the port engine. Of the 46 people on board 25 were killed, including the pilot and co-pilot, and most of the survivors were seriously injured.

AMENDMENTS TO THE BILL

COMMITTEE stage on the Civil Aviation (Licensing) Bill opened with protests from Opposition Members about the number of proposed Government amendments to the measure. Mr Strauss complained that it was difficult enough for the layman to understand the Bill in the first place, but with 26 amendments to the first two clauses it was a very considerable burden finding out what it all amounted to. Mr Chetwynd suggested that the necessity for such amendments proved that the bill had been ill-considered and in bad shape from the start.

Nevertheless Mr Sandys was granted his first series of amendments without divisions. They had the effect of settling a curious doubt. As originally drafted, the Bill made it an offence for an operator to fly an aircraft for business or reward unless he was the holder of an air operators' certificate; but it did not clearly provide that it was also an offence to *hold* a certificate and yet disregard its conditions. After Mr Chetwynd had been assured that there would be adequate Ministerial staff to enforce them, the proposed new provisions were accepted.

The committee also accepted an amendment moved by Mr Williams, a Conservative back-bencher. He sought to leave out the sub-paragraph which exempted the operators of small aircraft (i.e., those equipped to carry seven persons including crew) from the necessity of holding an air operators' certificate. Mr Williams and some of his colleagues considered that in certain cases such small operations might well divert significant traffic from other scheduled operators. Mr McMaster also sought to leave out this sub-paragraph and restrict the exemption to taxi services.

Mr Sandys generously agreed to listen to further views of the committee before making his decision. Views expressed were summed up by Mr Burden. He thought there was an obvious desire to ensure that "properly scheduled services were not impinged upon or eroded by pirate operations." Mr Williams said that all he and his hon. friends were aiming at was to secure a reasonable position for licensed operators and to "prevent the misfortune of someone coming in, perhaps on an *ad hoc* basis, to cream off the peak period traffic and damage or perhaps ruin the route."

Recalling the arguments advanced in past years in relation to the claim for independent operators to come in on the corporations' routes, one cannot but think that the fears expressed by Mr Williams were similar arguments writ smaller. Mr Sandys, however, explained that his case for exempting small aircraft operations was one of administrative convenience. Acknowledging the views of the committee he accepted the amendment deleting the sub-paragraph and undertook to provide himself with powers, at a later stage, to deal with the problem of the small aircraft operator by means of statutory instruments.

Another "clarifying" amendment of the Minister's, also accepted, exempted the "genuine charter flight" carrying cargo and passengers from the necessity to hold an air service licence. Previously the exemption applied to genuine passengers *or* freight charters but not to the mixed operation.

Drafting difficulties led Mr McMaster to move another amendment which, according to the Minister, would have exempted all UK aircraft from the principal provisions of the Bill. It emerged that what he in fact sought to do was to exempt operators of UK-registered aircraft operating from one point outside the country to another point outside it from the necessity of applying for a licence. The Minister undertook to look into this point before the report stage of the Bill.

In considering the clause as amended, Mr Strauss had some pertinent questions to ask about the staffing of both the proposed new board and the safety inspectorate. Other members agreed that writing words into a Bill was of no value unless they were competently and adequately interpreted and enforced.

Mr Sandys, briefly, gave a few figures. His estimate was that the new board would require a staff of about 20—excluding typing and junior staff. (The ATAC at present employs four.) There are now 60 or 70 people employed by the Directorate of Aviation Safety, and the Minister indicated that it would be necessary to set up an additional inspectorate requiring 18 more inspectors.

During its first day's sitting the committee divided on only one matter. Mr Rankin sought to provide that BOAC and BEA should specifically be included among the interests which the board must consult before granting an air service licence. He said that since their outstanding position was recognized on both sides it ought to be possible to guarantee that their views would be sought. Mr McMaster said that this proposal would mean that the corporations would be placed in the legal position of permanent advisers to the new board. The Minister explained that the kind of outside bodies which he had in mind for the board to consult ("at their discretion") were the Isle of Man Airports Board and the Channel Islands Air Advisory Council, which are now normally consulted by the ATAC. On a division the amendment was negatived. The committee adjourned after what Mr Sandys termed "good progress."

FRANK BESWICK

CUNARD AND "BRITISH EAGLE"

LAST Monday Eagle Aviation, hitherto the only one of Britain's "big five" independents with no shipping interests behind them, became part of the Cunard Steamship Company. Cunard announced "agreement in principle" to acquire a controlling interest in the Eagle group of companies. Sir John Brocklebank, the shipping line's chairman, said his company was aiming to buy "more than a 50 per cent" interest in Eagle, who would trade under their own identity with Cunard offices in Europe, the US and Canada augmenting their existing sales organizations.

It became known last week that the Eagle holding company, Harold Bamberg Holdings, had increased its share capital to £1m, and had changed its name to British Eagle International Airways. This is the name under which the Bermuda and Bahamas associates will henceforth trade; an application to the CAB has been applied for. There are no plans for the UK companies to trade under the new name.

Eagle are well established in Bermuda and the Bahamas, with Viscounts serving Miami, New York, Washington and Montreal, and they have a 2½-year-old application outstanding for London - Bermuda (*Flight*, January 29). Their acquisition of a Britannia "for evaluation" from Cubana (*Flight* last week) may have been with this route in mind.

FIRST ARGOSY ORDER

MORE information is now available about Trans Arabia Airways' decision to buy two Argosies, as reported in these pages last week. It is the first confirmed order for AWA's four-Dart freighter-coach. An option on a third aircraft has been placed. The order is worth £1.1m and delivery will be made, according to the official statement, "later this year." Presumably formal acceptance will not be possible until completion of the certification programme, now expected when route-proving is completed in June. It is believed that Trans Arabia will make a major contribution to the route-proving of the Argosy, and negotiations have, it is understood, been under way for an aircraft to be delivered to them during May for this purpose.

The general manager of Trans Arabia, Capt R. G. Gibson, reckons that the Argosy will cut turn-round time by 60 per cent, and he says that on all his airline's routes it will operate with a mixed freight and passenger layout. "Our traffic is expanding rapidly," he says, "and the Argosy will offer air freight facilities to shippers of bulky cargo such as automobiles."

BOAC COMET INCIDENTS

SOON after last week's issue went to press it became known that the BOAC Comet 4 G-APDS, which was severely damaged at Madrid on the night of March 14, hit high ground before landing.

BOAC are not yet prepared to disclose the cause or the circumstances of the incident, but it is believed that the aircraft was in the circuit at Barajas Airport preparatory to landing on Runway 23L (8,530ft). This calls for a right-hand circuit, and is not the main instrument runway, which is 33 (10,006ft). Whilst at a distance of about two miles from Runway 23 the aircraft struck the top of a ridge 345ft above airport level. Though the commander (Capt N. A. Mervyn-Smith) did not know this at the time, both main bogie wheel assemblies were torn off, as was the port pod tank. The incident occurred in darkness, so it is presumed that the tower was unable to report on the extent of the damage. The aircraft was then landed on Runway 33, alighting on the stubs of the main gear and the undamaged nosewheels. None of those on board, who included 24 in addition to the flight crew, suffered injury. It is believed that the aircraft is repairable, though it is severely damaged.

This is the fourth incident to a BOAC Comet 4 in the landing or approach phase in nine months. The last one occurred at Rome on December 23, when G-APDL was landed with its wheels retracted. This was attributed by BOAC to pilot error (*Flight*, March 4, page 323). The two other incidents, the circumstances and causes of which have never been disclosed by BOAC, were: (1) On June 9, 1959, G-APDA (Capt Hart) overshot the runway at Calcutta Dum Dum, having hit a tree on its first approach, causing damage to the flaps. On the second approach the aircraft over-ran the runway. There were no injuries. [Source: *Lloyd's List.*] (2) In the same month, on June 21, 1959, Comet 4 G-APDB (Capt J. A. Kelly) struck a 10ft steel jet-blast barrier while landing in daylight and perfect visibility at New York International Airport. Damage was caused to the flaps and undercarriage but the aircraft landed safely and there were no injuries. [Source: *Lloyd's List.*] In no case, it is understood, were the incidents attributable to any malfunctioning of the aircraft or engines.

BREVITIES

TCA is offering as a package sale its 21 North Stars, spares and ground equipment.

Empressa Aerovias Venezolanas have ordered a Convair 880 for delivery late next year. The airline is 30 per cent owned by PanAm.

A new record for IATA clearing house transactions was established in 1959, when turnover for the year was over £360m.

Ansett-ANA are reported to have taken an option on the first six Super Broussards to come off the production line.

It is reported from Cairo that the United Arab Republic intends to open routes from Cairo to Ghana and to South America from May 1.

Aer Lingus services have been sharply curtailed by a dispute involving 120 pilots. Some of the services have been flown by executive pilots and aircraft have also been chartered from other companies.

Icelandic Airlines, which since 1952 has operated DC-4s on cut-rate services between New York and Europe over Iceland, is reported to have bought two DC-6Bs from Pan American.

A two-day symposium on *Helicopters—Their Capabilities and Economics* is to be held at the Polytechnic, Regent Street, London, on Friday and Saturday, April 8 and 9. The fee is 3gns and individual or group enrolment is invited.

Undergoing trials by PanAm at Miami is this Lockheed palettized cargo loading system with the unhappy name of Jet PAAk. Seven can be installed in an Intercontinental Boeing 707 and 4½ tons of freight can be loaded in under ten minutes. The weight penalty is about 1,270lb

Continental Airlines are negotiating to purchase a fifth Boeing 707-124.

Lufthansa's jet services started on March 17 with the first of their Boeing 707-420 flights to New York from Hamburg via Frankfurt.

East African Airways made a provisional operating profit of £34,000 in 1959.

Japan's Civil Aviation Bureau has given tentative approval to All Nippon Airways for the purchase of three Fokker Friendships. Delivery would be in the spring of 1961.

Boeing 720Bs and 120Bs are to have normal thrust-reversers in the tailpipes of their Pratt & Whitney Turbofans plus a device to reverse the cold exhaust of the fan. No further details have yet been issued.

BEA's Viscounts are to operate regular daily scheduled services into Speke for the first time from April 1. They will be used on the Liverpool - Isle of Man and Liverpool - Belfast routes, on which the corporation is offering nearly 50 per cent greater capacity this year.

BEA's DC-3s are being progressively sold and none should be left in service by 1962. According to Lord Douglas, BEA's chairman, they are fetching prices of between £17,000 and £23,000. This is the first time that either corporation has quoted a price for its used aircraft.

A New Zealand delegation is to visit Paris in order to negotiate a new air agreement with France; the existing arrangement expires in July. The conference will discuss the rights of TEAL to fly into Papeete in French Tahiti and French rights to operate into Auckland.

The FAA has issued its first annual report. In it the administrator, E. R. Quesada, says that the Federal Aviation Act—after a year of operation—has been shown to be "basically sound in concept and workable in practice." The report is published by the US Government Printing Office, Washington 25, DC, price 30 cents.

The administrator has also been quoted as saying recently that experience with jets and some turboprops showed differences between certification standards and actual operating performance—"take-off and landing distances in flight manuals [are] not being achieved and greater-than-expected operating speeds . . . [are] forcing operators to introduce arbitrary margins to cater for these differences."

An Arab airline was one of the projects approved at the meeting in Cairo earlier this month of the economic council of the Arab League. According to a report in *The Times*, capital will be £17m, and the project will be considered by a committee which will report to the May meeting of the council. Together with other matters approved at the meeting (including the establishment of an Arab common market "within ten years") the proposed Arab airline will now be considered by the various governments.

THE INDUSTRY

G. B. G. Potter to Co-ordinate Smiths Research

FOLLOWING the recent announcement of the formation of a co-ordinating board responsible for the activities of a number of companies in the S. Smith & Sons (England) Ltd group, it is now made known that further reorganization has taken place.

Mr Potter

Whilst retaining the managing directorship of the various divisions, G. B. G. Potter, BSc, MIMechE, FRAeS, will also be concerned with directing collective research and engineering facilities. "This," say Smiths, "will bring under one authority the many specialized research and engineering facilities available to the divisions and will enable the aviation systems engineering and more complex instrument projects to be better co-ordinated." The statement adds that design authority for a systems project will be vested in the company most suited to handle it.

It is also announced that K. Fearnside, MA(Cantab), AMIEE, AFRAeS, has been appointed director of research and engineering of Smiths Aircraft Instruments. G. G. Roberts, MSC(Lond), FRAeS, remains technical director of Smiths Aircraft Instruments and will assist Mr Fearnside in his new appointment.

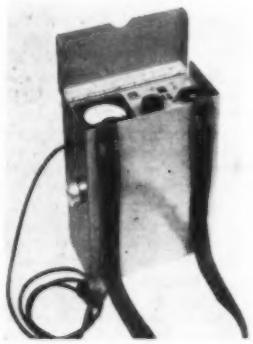
Fairey Engineering Changes

EXECUTIVE changes have been announced by the Fairey Co Ltd, the new appointments reflecting organizational changes brought about by the sale to Westland Aircraft last month of Fairey Aviation Ltd, the UK aviation subsidiary of Fairey. L. R. E. Appleton has been appointed managing director of Fairey Engineering Ltd and P. J. Duncton (who is already a director of Fairey Engineering) becomes general manager, Heston. The factory at Heston is now the new head office of Fairey Engineering Ltd. H. G. Gregory remains director and general manager of the Stockport factory of that company.

Activities of Fairey Engineering, which is one of the ten subsidiaries of the Fairey Co, include MoA repair and maintenance contracts (at Heston) for the Australian-designed and -built Jindivik, for which Fairey Engineering hold the European sales rights; and the manufacture of aircraft hydraulic power controls (at Hayes) for types which include the Scimitar, Hunter, CF-100, Rotodyne and Canberra PR.9.

Identifying Light Alloys

THE compact instrument illustrated here is one which should have a number of applications in the aircraft industry. Its purpose is to differentiate between various aluminium alloys, magnesium alloys and copper alloys by indicating the difference in conductivity of a layer near the surface of the material; and its patented feature is a circuit arrangement whereby the sensing head is made relatively insensitive to distance, so that it will give a virtually constant reading even when the head is not kept squarely on the surface, or when the surface is uneven. An anodized and/or painted surface, it is stated, does not affect the efficiency of the device. Developed as a result of basic research by British Aluminium Laboratories, the instrument —which is known as the Sortationer—is now in full production by Townson & Mercer Ltd, Beddington Lane, Croydon, Surrey.



Initial Indoctrination

RECALLING that the company were the first in the aircraft industry to have an apprentice scheme, Rear Admiral Sir Matthew Slattery, chairman of Short Bros & Harland, said at the apprentices' prize-day on March 12 that they were extremely pleased with the way their new training scheme was working out. A year ago he had spoken of the decision to train all apprentices, in a special school and for a whole 12 months, in a form of initial indoctrination before they went on to the later stages of apprenticeship. The school had been working on that basis for the past year and was producing very satisfactory results.

Sir Matthew continued: "We are trying to tell the boys about their country, about industry, their duties as citizens, their place in the community—to mention only a few of the things which enter into this new curriculum. You may say, why are we doing that? I think it is because we feel that industry today is a great partnership. The days when you talked about the bosses and the workers are out of date."

At Short Bros' apprentices' prize-day: W. N. May, Northern Ireland Minister of Education, with Mrs May and Rear Admiral Sir Matthew Slattery, the company's chairman, inspects a model of the Britannic made by K. Hillis, best all-round third-year apprentice

Facilitating Crash-clearance

THE utility of inflatable fabric bags for lifting crashed aircraft prior to removal has long been recognized, but a letter lately received by the R.F.D. Co Ltd, from the chief aerodrome fire officer at Entebbe Airport, Uganda, emphasizes the simplicity and efficiency of the method. The letter reads, in part: "Ten days after I took delivery of the R.F.D. air-bags a Dakota crashed on the airport, and presented quite an obstruction on the main runway. However, with the aid of two of the 4ft × 4ft × 4ft bags which were put into use straight from their transit crates, the aircraft was raised in 90min and towed away. Without the bags the runway would have been closed for 24 hours at least. I might add that none of the staff at this airport had any previous experience of lifting aircraft with this type of equipment."

IN BRIEF

Microcell Ltd announce that W. A. Bartlett has been appointed to the board as an executive director.

An illustrated brochure summarizing apprentice training in the de Havilland companies in Great Britain has been published by the de Havilland Aircraft Co Ltd, Hatfield, Herts.

R. G. Tolley joins the Simms Group of Companies this month as director and general manager of Aircraft Steel Structures Ltd. He was until recently managing director of a light engineering firm.

Douglas Lang has been appointed chief sales engineer of English Electric's Aircraft Equipment Division, which he joined in 1956 as an applications engineer. He succeeds T. E. Simms, who recently became chief project engineer.

Allan Sadler, MSA, MIMechE, FRAeS, has joined Ultra Electronics Ltd as research and development manager. He was previously manager of engineering and development laboratories for Smiths Aircraft Instruments Ltd.

Airwork Services Ltd have made two new staff appointments. D. M. Roberts becomes engineering manager and Sqn Ldr J. P. Tyzack, for several years the company's chief test pilot, becomes Cessna sales manager and will be based at Airwork House in Piccadilly.

Andrew Garratt has been appointed public relations manager of D. Napier & Son Ltd in succession to C. G. Hollowell, who has become joint deputy publicity manager (general) of English Electric. Mr Garratt was formerly English Electric aeronautical advertising executive.

A. G. "Tony" Brownsill, who left the Goodyear Tyre & Rubber Co (Great Britain) Ltd at the end of last year, informs us that he is now export sales manager for Francis Caird (Overseas) Ltd, the selling organization for Munro & Miller Ltd.

Airtech Ltd announce that they have received "a substantial order" from the MoA for an air-transportable FSK transmitting and receiving station/message-centre. Each station utilizes a number of the company's "Aircon" containers and their associated running gear. This equipment was recently approved after a series of trials by the Air Ministry and the Fighting Vehicles Research and Development Establishment.

Correspondence

The Editor of "Flight" is not necessarily in agreement with the views expressed by correspondents in these columns. Names and addresses of writers, not for publication in detail, must in all cases accompany letters.

The FAA Report and Decca

WITH reference to the article entitled "That FAA Report on Decca" which appeared in *Flight* for March 4, I think you may be interested in publishing the letter I wrote to the editor of *Aviation Week* on the same subject:—

"I refer to the news item 'FAA Raps Decca' in your January 4th issue, and also to an article in the British *Daily Telegraph* containing a synopsis of the FAA report press release. I cannot comment fully until the actual report is available, but as a practising airline pilot with considerable experience on Decca Mark 10, I would like to make the following observations:—

"(1) Within the normal rated coverage of the European Decca chains, i.e. 220-250 n.m. by day and 200 n.m. by night, I personally have not encountered deviations of the tracking pen on the log chart.

"(2) I cannot understand the criticism relating to difficulties encountered due to lack of a pre-printed course. It is the normal practice to have tracks printed on the Flight Log charts for en-route navigation in accordance with the ATC routeings which are pre-determined anyway. However, Decca is used without difficulty in the London Control Zone every day without a pre-printed course being incorporated on the Flight Log chart and, in fact, one of the big advantages of the Decca system with its pictorial presentation is that one can see at all times one's position relative to holding areas, runway extensions, etc. On the subject of holding areas, one of the major advantages of Decca over other systems is that the captain can see exactly where he is in the holding area and is able to stay precisely within the area regardless of the wind position. This results in minimum workload and consequently far less strain on the pilot.

"(3) I do not understand the criticism relative to performance at intermediate ranges. I have experienced satisfactory operation of European Decca chains up to the ranges noted above and frequently ranges in excess of these figures are encountered.

"(4) Decca is not, of course, an instrument approach aid but it does prove extremely useful for lining up with the ILS localizer and also for break-cloud procedures to runways not equipped with a precision aid.

"(5) I would not agree that manipulation of the Decca controls is 'relatively cumbersome.' The initial setting-up is perfectly straightforward and during flight little manipulation is required."

Beaconsfield, Bucks J. MONRO (Captain)

Turbine-fuel Fire Risks

IN your issue of March 4 you reported Lord Brabazon's recent remarks concerning various aspects of air safety. As a power-plant engineer I was most interested in his reference to fuels being used in turbine-engined airliners, for I have been waging my own private campaign against the use of JP.4 (known also as "wide-cut gasoline"). This is the fuel to which Lord Brabazon was presumably referring when he spoke of "petrol" being used in place of the more desirable kerosine.

The use of aviation gasoline with its attendant dangers has long been accepted for piston-engined aircraft, but with the advent of the kerosine-burning turbine engine a new and improved standard of safety became available. JP.4, an intermediate type of fuel produced primarily for military considerations, was made available early in the fifties. Unfortunately it is just as dangerous as aviation gasoline, and in some respects more so. Some airlines have been tempted to use JP.4 for reasons which are to me almost incomprehensible.

It would be as well to observe here that no fuel can be regarded as "safe", and it has often been pointed out that kerosine-fuelled aircraft have "burned just the same" in crashes. Indeed they have burned, and when large volumes of fuel mist are generated in a crash there is little to choose between the different fuels. The claim for kerosine is based not so much on its lesser proneness to catch fire, but rather on its rate of flame-spread when once ignited. In this respect it is markedly safer than JP.4 and gasoline. Within the scope of this letter it is not possible to go into a discussion of fuel properties, which is a pity since there is the most widespread ignorance and apathy concerning this subject among people who build and operate aircraft.

Lord Brabazon refers scathingly to operators who use JP.4, and he was presumably referring principally to a prominent North American airline. Last year I had perforce to use this operator's services for some journeys I made in Canada, and I decided to make a strong protest against their use of JP.4. This led to an exchange of long letters between their chief engineer and myself in which they argued a case for the alleged superiority of that fuel. When challenged to produce evidence, however, the airline failed to do so, their final letter being of the "well, we haven't killed anyone yet" type.

I should be pleased to be given the names of any other operators known to be using JP.4 so that I may carry my protest to them also.

Should operators kill passengers due to the use of petrol instead of paraffin, Lord Brabazon adds, they should be "had up for manslaughter." I would respectfully suggest to his Lordship that prevention is better than cure, and that the best way of bringing pressure to bear on these people would be to publish their names and advise air travellers to boycott their services on the grounds that they are offering an inferior standard of safety. No passenger should consent to being flown in an aeroplane propelled by an unnecessarily dangerous fuel, any more than he should consent to crossing the Atlantic without a life jacket under his seat.

Lord Brabazon, by so forcibly expressing his opinion and, by implication, that of the Air Registration Board, has performed a great service in the cause of safety. Some years ago a representative of the ARB publicly stated it as the Board's opinion that kerosine was the only fuel suitable for civil turbine-powered aircraft. It is satisfying to be able to infer that the Board are still of this opinion, but I am a little disappointed that this commonsense view has not become cushioned in British Civil Airworthiness Requirements.

Harpenden, Herts J. W. RICKARD

Cut-rate Airline Fares

I WAS interested to read the paragraph on page 353 of the March 11 issue of *Flight* headed "Cheap Fares from Africa," particularly in view of the current interest in the new Civil Aviation (Licensing) Bill.

Presumably, such a series of charter flights by clubs or so-called closed groups will contravene the new Act, because the passengers carried will pay separate fares—unless South African Airways apply for, and are granted, a licence by the proposed Air Transport Licensing Board.

I can envisage that, if such a licence were granted, it would lay the field wide open for other clubs or similar organizations, and make a complete mockery of IATA. No doubt travel agents in this country will agree with their South African counterparts that low fares on flights operated regularly should be available to the public generally, and not restricted to club members.

Gravesend, Kent B. ALLEN

Airliners and Atomic Tests

IN your issue of March 4 you published a note on our report on radiation as it may affect airline passengers and crews. At the time we had just checked on the Saharan tests and were concerned at the lack of assurances given on the maximum tolerable "breathing" and "whole body" doses. Since writing to you, however, we have received the relevant information from the British Radiological Protection Service and this appears to give the necessary assurance, at least in relation to the scale and control of the recent tests.

We are advised that our readings indicate that the radiation dose encountered in a flight shortly after the test was no more than equivalent to the total weekly dose from normal background sources and was therefore "negligibly small." This is substantiated by a test for the two gamma emitting elements, potassium and cesium—137, on the pilot concerned—which again gave readings within the "normal range."

We shall continue as far as possible to monitor and report on all atomic tests.

London W1 C. C. JACKSON,
Executive Secretary, International Federation of Airline Pilots Associations

FORTHCOMING EVENTS

Mar.	25.	RAeS Man-powered Aircraft Group: "Aerodynamics of Manpowered Flight," by D. Perkins.
Mar.	28.	Radar and Electronics Association: "Some Design Problems of Large-scale Computers," by Peter D. Hall.
Mar.	29.	Institute of Transport (West Middlesex Group): "Rotary-wing Aircraft," by Sqn Ldr W. R. Gellatly.
April	7.	RAeS (Main Lecture at Coventry Branch): "Optimum Size of Rocket Engines," by J. E. P. Dunning.
April	7.	British Interplanetary Society: "Lunar Missions and Vehicle Design," by J. Allen.
April	7.	Society of Instrument Technology (Data Processing Section): "The Electronic Computer in . . . Missile Trials," by W. C. J. White and D. L. Overheu.
April	7-9.	College of Aeronautics, Cranfield: Flight-test Instrumentation Symposium.
April	8.	RAeS Rotorcraft Section: "Experiences with an Operational Heliport," by R. A. C. Brie.
April	8-9.	The Polytechnic (Regent Street, London): Symposium: "Helicopters—Their Capabilities and Economics."
April	13.	British Institution of Radio Engineers (Computer Group): "Guided Weapon Control," by F. R. J. Spearman.
April 14-24.		International Air and Space Exposition, Los Angeles.
April 19-21.		International Airline Navigators Council: Tenth Annual Convention, New York.
April	20.	London and Home Counties Regional Advisory Council for Technological Education, and Brunel College of Technology: Conference on the Selection of Materials.

RAeS Branch Fixtures (to April 1): *Mar. 25, Bristol,* a.g.m. and Film Show; *Hatfield,* Annual Dinner; *Swindon,* Annual Buffet Dance. *Mar. 30, Preston,* "The Salvage of 'The Empress of Canada,'" by Capt C. R. Colbeck; *Southampton,* a.g.m.

Three RCAF pilots who recently completed preliminary flight evaluations of the Canadair CL-41 seen with representatives of the company. L to r: Flt Lt M. G. Sauder, CFS, Saskatoon; I. E. MacTavish, assistant chief test pilot, engineering flight test, Canadair; Flt Lt K. Waterhouse, Air Training Requirements, RCAF HQ; F. C. Phillips, assistant chief engineer, technical, Canadair; Sqn Ldr R. J. Hamilton, Directorate of Air Training, RCAF HQ; and H. J. Everard, manager, tactical aircraft sales, Canadair

SERVICE AVIATION

Royal Air Forces and Naval Flying News

Mounting Starlight

DURING last week Britannia, Hastings and Beverley aircraft of Transport Command were busy carrying out troops and stores to North Africa on the big Army/RAF mobility exercise code-named Starlight. This was the Britannias' first participation in such an event, and their 110-men capacity, interior comfort and long range were shown off to good effect on the 1,700-mile airlift in which upwards of 4,000 men (mainly Guards Brigade) were involved. The four Britannias taking part were all aircraft of No 99 Sqn and made about 29 sorties from Lyneham. The Hastings transports also operated from there and the Beverleys, which carried freight, from Abingdon. Beverleys (including some from Aden and Kenya) were being employed on the tactical airlift from El Adem to Tmimi, a desert airstrip 50 miles north-westwards which formed the airhead for the mock battle. A first-hand report of Starlight, illustrated with photographs, is to appear in *Flight*.

RAF at Butterworth

HARD on the heels of our resumé last week of 25 years' rotating-wing operations by the Royal Air Force has come news of the work of one of its helicopter squadrons in Malaya. This unit, No 110 Sqn, flies with Whirlwinds from the RAAF base at Butterworth. It is commanded by Sqn Ldr Frank Barnes, and of the seven aircraft and 13 pilots a correspondent (Flt Lt Peter Finn) wrote recently: "Their work is an important part of the Far East Air Force in Malaya, and although the squadron pilots are outnumbered at the RAAF base at Butterworth their job is an adjunct to the higher-flying and faster-moving Sabre and Canberra pilots."

Flt Lt Finn described an operation on which he flew with Sqn Ldr Barnes, to pick up a fever-stricken Ghurka soldier from a landing-zone on a 2,800ft hill in the jungle and take him to the British General Hospital at Taiping—a type of "casevac" performed regularly by squadron pilots, in addition to troop-carrying and other duties. No 110 Sqn (formerly No 194) has been at Butterworth since September last year. Its motto is *To find and uplift* and its emblem represents a dragonfly hovering over a Malayan kris (dagger).

Proud Display

SOUTHAMPTON UAS had both the Hack and Cooper Trophies on display at their annual dinner on March 11 in the Nuffield United Services Officers' Club at Portsmouth, and in expressing squadron pride in having won these last July the CO, Sqn Ldr A. A. Pearce, referred to the pleasant coincidence that Wg Cdr Hack had been the first of his predecessors in command.

He also took pride in stating that Southampton UAS was one of only two university squadrons to have a technical flight; and AVM H. A. V. Hogan, the principal RAF guest (points from whose speech were reported in *Flight* last week, p. 357), said that Southampton was the smallest university in the country to have an air squadron.

AVM Hogan presented the Livesey Trophy, for the best Technical Flight student, to Acting Plt Off J. A. P. Stoddart; the Bendall Trophy, for the best first-year GD student, to Cdt Plt M. J. Webber; the Petter Trophy, for aerobatics, to Acting Plt Off A. R. M. Pickering; and the UAS Individual Rifle Championship Miniature Cup to Acting Plt Off M. J. Menear.

Freedom of Gloucester

GLOUCESTER is to present local RAF units with freedom of entry to the city, at a ceremony on April 7. Principal guest will be the Duchess of Gloucester, Air Chief Commandant of the WRAF; and the Scroll of Freedom is being handed to the CO of RAF Innsworth, Gp Capt S. E. D. Mills, by the Mayor, Ald W. J. Smith, a former RAF officer. There is to be a march-past by some 500 RAF and WRAF personnel, and six Hunters are to fly over in salute at the moment of presentation.

RAF associations with Gloucester, to which they were affiliated in 1948, go back nearly twenty years to the formation of No 7 School of Technical Training at Innsworth in 1940. The RAF Record Office is at Gloucester; and Gloster aircraft—from the Grebe and Gamecock to Meteor and Javelin—have been used by the RAF for nearly forty years. Gloucestershire had its own Auxiliary squadron, No 501, from 1929 until the disbandment of the RAuxAF in 1957.

IN BRIEF

Wg Cdr R. B. Bolt has succeeded Wg Cdr A. H. Harding as Director of Operations and Training, RNZAF, on the latter's retirement.

Wg Cdr M. Constable-Maxwell, an ex-Battle of Britain pilot, has been appointed CO of Gan, the RAF staging post in the Maldive Islands.

A total of £2,194 was collected for the RAF Benevolent Fund from foreign coins put by travellers in collecting boxes at British airports during last year.

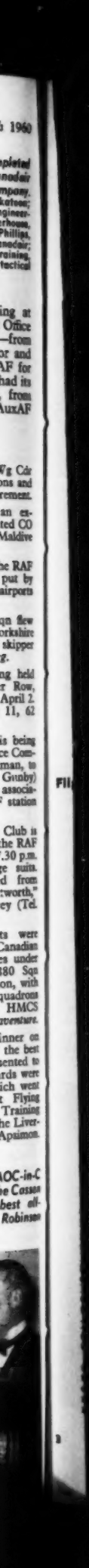
A Sycamore from No 228 ASR Sqn flew more than 85 miles out to sea off the Yorkshire coast last Friday to pick up the injured skipper of the Hull fishing-boat *Fredericksborg*.

No 84 Sqn annual reunion is being held in the Artillery Arms, 102 Rochester Row, London SW1, at 7 p.m. on Saturday, April 2. Enquiries to Owen Greenwood, Flat 11, 62 Belgrave Road, SW1.

A silver model of a Fairey Battle is being presented by the AOC-in-C Maintenance Command, Air Marshal Sir Douglas Jackman, to the Mayor of Sutton Coldfield (Cllr A. Gunby) on April 6 to commemorate 19 years' association between the town and local RAF station until the latter's closure in 1958.

No 60 Sqn (RAF) Officers Dinner Club is holding its seventh annual reunion at the RAF Club, Piccadilly, London, W1, at 7 for 7.30 p.m. on Friday, April 29. Dress, lounge suits. Tickets (13s 6d) may be obtained from Air Cdre W. Wynter-Morgan, "Wentworth," Mount Hermon Road, Woking, Surrey (Tel. Woking 995).

Two squadron CO appointments were recently announced by the Royal Canadian Navy. No 870 Sqn (Banshees) comes under Lt Cdr K. S. Nicolson and VS 880 Sqn (Trackers) under Lt Cdr W. J. Walton, with the rank of commander. Both squadrons operate from the Naval air station HMCS *Shearwater* or the aircraft carrier *Bonaventure*.

At the Liverpool UAS annual dinner on March 15 the Thornton Trophy, for the best all-round cadet of the year, was presented to Acting Plt Off J. Ambler. Other awards were the Naismith Aerobatic Trophy, which went to Plt Off G. Hayes; Instrument Flying Trophy, to Plt Off J. Lee; Ground Training Trophy, to Cdt Plt D. Kitchen: and the Livermore Citizen Trophy, to Plt Off J. Apsimon.

Air Marshal Sir Hugh Constantine, AOC-in-C Flying Training Command, presents the Casson Trophy, awarded annually to the best all-round cadet, to Acting Plt Off P. G. Robinson at the Leeds UAS dinner